2015 Timberlake Community Club
ANNUAL DRINKING WATER QUALITY REPORT

We are pleased to present to you the Annual Drinking Water Quality Report, this report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources while improving the system for the future.

Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Some water facts: Water consists of three atoms, 2 Hydrogen atoms and an Oxygen atom, that bond together due to electrical charges.

Water regulates the Earth's temperature.

Human brains are 75% water.

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Arthur Bushey, WDM2 /CCS at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call. The Timberlake Water Board meets the 3rd Tuesday of each month 6:30 p.m. at the MPC. We would be happy to have you attend. Water Board members are, Water Director Terry Hubbard, Mont Jeffreys, Dennis Winchel, Bill Bruder and Scott Woods.

The Timberlake Water Department regularly monitors for various contaminants in your drinking Water according to Federal and State laws. All drinking water, including bottled water, may be reasonably expected to contain at least small amounts of some contaminants. It's important to remember that the presence of these contaminants does not necessarily pose a health risk. More information can be obtained by calling the Environmental Protection Agency's Safe Drinking water Hotline at 1-800-426-4791.

The MCL's (Maximum Contaminant Level) are set at very stringent levels. To understand the possible health effects described for many regulated contaminants, a person would have to drink 2 liters of water every day at the MCL level for a lifetime to have a one-in-a-million chance of having the described health effect.

Total Coliform: The Total Coliform Rule requires water systems to meet a stricter limit for coliform bacteria. Coliform bacteria are usually harmless but their presence can be an indication of disease-causing bacteria. When coliform bacteria are found, special follow-up tests are done to determine if harmful bacteria are present in the water supply. If this limit is exceeded in these follow-up tests, the water supplier must notify the public by newspaper, television or radio. At Timberlake Community Club Inc. we also use the Reader Board at the entrance and our automatic calling system.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immune-compromised persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly or infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline, 1-800-426-4791.

In our continuing efforts to maintain a safe and dependable water supply, it may be

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necessary to make improvements in the water system.The costs of these improvements may be reflected in the rate structure.

In the following table you will find many terms and abbreviations you might not be familiar with. To help you better understand these terms, we've provided the following definitions:

Maximum contamination level (MCL): The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLGs as feasible using the best available treatment technology.

Maximum contamination level goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

Action Level (AL): concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow***.***

The Treatment Technique (TT): A treatment technique is a required process intended to reduce the level of a contaminant in drinking water.

Millireims per year (MREM/YR): The measure of radiation absorbed by the body.

Million Fibers per Lit (MFL): The measure of the presence of asbestos fibers longer than 10 micrometers.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the Benefits of the use of disinfectants to control microbial contaminants.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant Allowed in drinking water. There is convincing evidence that the addition of a Disinfectant is necessary for the control of microbial contaminants.

Variances and exceptions (V&E): State EPA permission not to meet an MCL or a treatment technique under certain conditions. The Timberlake Community Club Inc. water system has not found it necessary to apply for any variances or exceptions.

PPM- Parts per million
PPB- Parts per billion
VOC's- Volitile organic chemicals

Note: We have an asbestos waiver; this is because we have less than 10% asbestos content pipe in our total system.

Also: The Washington State Department of Health reduced the monitoring requirements for Synthetic Organic Chemicals because the source is not at risk for contamination. The last samples collected for these contaminants were taken in 2012 and was found to meet all applicable standards.

Tests for total Coliform Bacteria are taken monthly (2 tests at 12 alternating locations throughout the community). All of the samples tested in 2014 were satisfactory, information on these test results are available at the MPC.

Information on your irrigation system and why you may need a **back flow preventer** on your irrigation system, hot water tank expansion and more, are all available at the MPC or at the Water Department.

Water Conservation helps save money and water, we have available at the Timberlake Community Club Inc. MPC or the Water Department "**100 tips to help conserve water**" among others, stop by for a copy.

2880 E Timberlake W Drive
Shelton, WA 98584
www.timberlakecc.com
timberlakewater@hctc.com

WATER QUALITY DATA 2015

The Timberlake Water Department tests for more than 80 drinking water contaminates as required by the Environmental Protection Agency and the Washington State Department of Health (DOH). The DOH requires us to monitor for certain contaminants less than once per year because the concentrations of these contaminates are not expected to vary significantly from year to year. Most of the data, though representative of the water quality, is from tests taken during the 2014 calendar year unless other wise noted. Only those contaminants that have been detected are listed in the table. Complete copies of all contaminates that are tested for are posted in the MPC and available upon request.

EPA Lead Statement: *If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. Timberlake Community Club, Inc.is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using your water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the SAFE DRINKING WATER HOT LINE or on line at http://www.epa.gov/safewater/lead.*

Timberlake Community Club is required to test for **Lead and Copper** every three years. Ten (10) lead and copper samples were taken in 2013 at various residential locations in the community. All of the samples tested and reported were below the **Action Level** of **1.3 mg/l** copper and **0.015 mg/l** lead. The results of the tests were sent to all participating Timberlake Members as required.

Timberlake Community Club started the Disinfection Byproducts **Stage 2** testing requirements in 2014. Timberlake is now required to take two (2) samples annually.

Disinfection Byproducts based on the last EPA required test
Sample site # 1

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/04/14	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/04/14	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	2.93	09/04/14	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/04/14	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	9.74	09/04/14	N	
• **Total HAA's**	**60**	6.0	**12.7**	09/04/14	**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.25	39.2	09/04/14	N	
❖ Bromodichlormethane (ppb)	*	0.5	12.33	09/04/14	N	
❖ ❖ Chlorodibrormethane (ppb)	*	0.5	ND	09/04/14	N	
❖ Bromoform (ppb)	*	0.5	ND	09/04/14	N	
****Total THHM/s (ppb)**	**80**		**41.6**	09/04/14	**N**	

Disinfection Byproducts based on the last EPA required test
Sample site # 2

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/04/14	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/04/14	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	2.50	09/04/14	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/04/14	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	4.25	09/04/14	N	
• **Total HAA's**	**60**		**6.75**	09/04/14	**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.25	39.6	09/04/14	N	
❖ Bromodichlormethane (ppb)	*	0.5	2.27	09/04/14	N	
❖ ❖ Chlorodibrormethane (ppb)	*	0.5	ND	09/04/14	N	
❖ Bromoform (ppb)	*	0.5	ND	09/04/14	N	
**Total THHM/s (ppb)	**80**		**41.9**	09/04/14	**N**	

*Potential health effects of HAA's from ingestion of Water: Increased risk of cancer.
**Potential Health Effects of TTHM's from Ingestion of Water: Liver, kidney or central nervous system problems; increased risk of cancer

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For more information: Division of Drinking Water: http://www.doh.wa.gov/ehp/dw
EPA Arsenic Information: http://www.epa.gov/OGWDW/arsenic.html
Agency for Toxic Substances and Disease Registry (U.S. Centers for **Disease Control and Prevention):** http://www.atsdr.cdc.gov/tfacts2.html

2016 Timberlake Community Club
ANNUAL WATER QUALITY REPORT

The Timberlake Board of Directors and the Timberlake Water Board are pleased to present to all Timberlake Community Club members the 2016 Annual Water Quality Report also known as the Consumer Confidence Report. This report is designed to inform you about the water quality and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water. We want you to understand the efforts we make to continually improve the water treatment process and protect our water resources while improving the system for the future.

Our water source is ground water drawn from 3 deep wells. Our Aquifer draws from the Oakland Bay Watershed. The water is disinfected with sodium hypochlorite and filtered to remove iron, manganese and hydrogen sulfide.

Some water facts: In a hundred year period a water molecule spends 98 years in the ocean, 20 months as ice, 2 weeks in lakes and rivers and less than a week in the atmosphere.

* Most of the world's people must walk 3 hours to fetch water.

*70% of an Elephant is water.

Our drinking water is safe and meets federal and state requirements.

If you have any questions about this report or concerning your water utility, please contact Arthur Bushey, WDM2 /CCS at 427-8928 between 8:00 am and 4:00 pm, Monday through Friday. If this is inconvenient please leave a message on our answering machine and we will return your call.

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timberlakewater@hctc.com

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Timberlake Community Club started the Disinfection Byproducts **Stage 2** testing requirements in 2014. Timberlake is now required to take two (2) samples at different locations annually.

Disinfection Byproducts based on the last EPA required test
Sample site # 1

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/14/15	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/14/15	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	2.4	09/14/15	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/14/15	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	5.6	09/14/15	N	
• **Total HAA's**	**60**	6.0	**8.0**	09/14/15	**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.25	45.9	09/14/15	N	
❖ Bromodichlormethane (ppb)	*	0.5	2.4	09/14/15	N	
❖ Chlorodibrormethane (ppb)	*	0.5	ND	09/14/15	N	
❖ Bromoform (ppb)	*	0.5	ND	09/14/15	N	
****Total THHM/s (ppb)**	**80**		**48.2**	09/14/15	**N**	

Disinfection Byproducts based on the last EPA required test
Sample site # 2

Contaminants	MCL	MCLG	Timberlake Water	Sample Date	Violation Y/N	Typical Source of Contamination
Haloacitic Acids (HAA's)						**Byproduct of drinking water disinfection**
❖ Monochloroacetic Acid (PPB)	*	2.0	ND	09/14/15	N	
❖ Monobromoactic Acid (ppb)	*	1.0	ND	09/14/15	N	
❖ Dichloroacetic Acid (ppb)	*	1.0	5.8	09/14/15	N	
❖ Dibromoacetic Acid (ppb)	*	1.0	ND	09/14/15	N	
❖ Trichloroacetic Acid (ppb)	*	1.0	13.9	09/14/15	N	
• **Total HAA's**	**60**		**19.6**	09/14/15	**N**	
Trihalomethanes (THHM)						**Byproduct of drinking water disinfection**
❖ Chloroform (ppb)	*	0.25	42.9	09/14/15	N	
❖ Bromodichlormethane (ppb)	*	0.5	1.9	09/14/15	N	
❖ Chlorodibrormethane (ppb)	*	0.5	ND	09/14/15	N	
❖ Bromoform (ppb)	*	0.5	ND	09/14/15	N	
****Total THHM/s (ppb)**	**80**		**44.9**	09/14/15	**N**	

*Potential health effects of HAA's from ingestion of Water: Increased risk of cancer.
**Potential Health Effects of TTHM's from Ingestion of Water: Liver, kidney or central nervous system problems; increased risk of cancer

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http://www4.doh.wa.gov/SentryInternet/FindWaterSystem.aspx

For more information: Division of Drinking Water: http://www.doh.wa.gov/ehp/dw
EPA Arsenic Information: http://www.epa.gov/OGWDW/arsenic.html
Agency for Toxic Substances and Disease Registry (U.S. Centers for **Disease Control and Prevention):** http://www.atsdr.cdc.gov/tfacts2.html

Project Inventory

Title:
Project Engineer: John Nottingham
Project Date: 03/23/07
Comments:

Imported from f:/50-timberlakes/water cad/wc model 2002.c2w

Scenario Summary	
Scenario	WSP Year 2026
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Demand-2026 PHD
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational
Logical Control Set Alternat	<All Logical Controls>
Age Alternative	Base-Age Alternative
Constituent Alternative	Base-Constituent
Trace Alternative	Base-Trace Alternative
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Liquid Characteristics			
Liquid	Liquid - properties from imported file	Specific Gravity	1.00
Kinematic Viscosity	1.06e-5 ft²/s		

Network Inventory			
Pressure Pipes	195	Number of Tanks	1
Number of Reservoirs	1	- Constant Area:	1
Number of Pressure Junctic	167	- Variable Area:	0
Number of Pumps	3	Number of Valves	0
- Constant Power:	0	- FCV's:	0
- One Point (Design Point):	0	- PBV's:	0
- Standard (3 Point):	3	- PRV's:	0
- Standard Extended:	0	- PSV's:	0
- Custom Extended:	0	- TCV's:	0
- Multiple Point:	0	- GPV's:	0
Number of Spot Elevations	0		

Pressure Pipes Inventory			
2.0 in	24,285.00 ft	6.0 in	19,316.00 ft
3.0 in	12,150.00 ft	8.0 in	1,170.00 ft
4.0 in	18,025.00 ft	10.0 in	80.00 ft
Total Length	75,026.00 ft		

Scenario: WSP Year 2006 (P1+D)
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
1590	1	260.00	Demand	0.52	Pattern - 1	0.52	344.15	36.48
400	1	250.00	Demand	1.55	Pattern - 1	1.55	344.14	40.81
390	1	240.00	Demand	0.52	Pattern - 1	0.52	344.15	45.15
410	1	240.00	Demand	2.98	Pattern - 1	2.98	344.15	45.15
380	1	235.00	Demand	3.62	Pattern - 1	3.62	344.01	47.26
640	1	230.00	Demand	2.59	Pattern - 1	2.59	344.79	49.76
290	1	230.00	Demand	0.52	Pattern - 1	0.52	345.38	50.02
20	1	230.00	Demand	0.52	Pattern - 1	0.52	345.38	50.02
10	1	230.00	Demand	0.00	Pattern - 1	0.00	345.45	50.05
J-6	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.11	50.77
J-2	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.11	50.77
J-4	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.11	50.77
870	1	227.00	Demand	7.24	Pattern - 1	7.24	345.06	51.18
600	1	225.00	Demand	1.55	Pattern - 1	1.55	344.69	51.89
30	1	225.00	Demand	0.52	Pattern - 1	0.52	345.31	52.16
160	1	220.00	Demand	2.07	Pattern - 1	2.07	344.17	53.83
560	1	220.00	Demand	1.03	Pattern - 1	1.03	344.59	54.01
820	1	220.00	Demand	1.03	Pattern - 1	1.03	344.84	54.12
810	1	220.00	Demand	0.52	Pattern - 1	0.52	344.85	54.12
800	1	220.00	Demand	1.55	Pattern - 1	1.55	344.86	54.13
790	1	220.00	Demand	0.52	Pattern - 1	0.52	344.87	54.13
780	1	220.00	Demand	1.03	Pattern - 1	1.03	344.90	54.15
770	1	220.00	Demand	1.03	Pattern - 1	1.03	344.90	54.15
760	1	220.00	Demand	2.07	Pattern - 1	2.07	344.91	54.15
750	1	220.00	Demand	0.52	Pattern - 1	0.52	344.94	54.17
740	1	220.00	Demand	1.55	Pattern - 1	1.55	344.98	54.18
730	1	220.00	Demand	1.55	Pattern - 1	1.55	344.99	54.19
710	1	220.00	Demand	1.03	Pattern - 1	1.03	345.10	54.23
720	1	220.00	Demand	1.03	Pattern - 1	1.03	345.10	54.23
700	1	220.00	Demand	1.03	Pattern - 1	1.03	345.11	54.24
690	1	220.00	Demand	1.03	Pattern - 1	1.03	345.21	54.28
680	1	220.00	Demand	1.03	Pattern - 1	1.03	345.22	54.28
370	1	215.00	Demand	2.07	Pattern - 1	2.07	344.18	56.00
1580	1	210.00	Demand	1.03	Pattern - 1	1.03	344.00	58.09
1560	1	210.00	Demand	2.59	Pattern - 1	2.59	344.00	58.09
1570	1	210.00	Demand	2.59	Pattern - 1	2.59	344.00	58.09
1520	1	210.00	Demand	2.59	Pattern - 1	2.59	344.03	58.11
150	1	210.00	Demand	4.14	Pattern - 1	4.14	344.18	58.17
120	1	210.00	Demand	3.10	Pattern - 1	3.10	344.28	58.21
940	1	210.00	Demand	8.27	Pattern - 1	8.27	344.30	58.22
270	1	210.00	Demand	1.55	Pattern - 1	1.55	344.49	58.30
510	1	210.00	Demand	2.07	Pattern - 1	2.07	344.50	58.31
530	1	210.00	Demand	0.52	Pattern - 1	0.52	344.59	58.35
550	1	210.00	Demand	0.52	Pattern - 1	0.52	344.60	58.35
830	1	210.00	Demand	4.14	Pattern - 1	4.14	344.82	58.45
650	1	210.00	Demand	3.62	Pattern - 1	3.62	345.18	58.61
280	1	210.00	Demand	3.62	Pattern - 1	3.62	345.22	58.62
50	1	210.00	Demand	1.55	Pattern - 1	1.55	345.22	58.62
40	1	210.00	Demand	1.55	Pattern - 1	1.55	345.24	58.63
140	1	208.00	Demand	2.07	Pattern - 1	2.07	344.21	59.05
130	1	208.00	Demand	3.10	Pattern - 1	3.10	344.24	59.06

Scenario: WSP Year 2006
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
450	1	208.00	Demand	1.55	Pattern - 1	1.55	344.37	59.12
470	1	208.00	Demand	1.03	Pattern - 1	1.03	344.39	59.13
490	1	208.00	Demand	0.52	Pattern - 1	0.52	344.44	59.15
1480	1	205.00	Demand	3.10	Pattern - 1	3.10	344.03	60.27
1490	1	205.00	Demand	2.59	Pattern - 1	2.59	344.06	60.28
1550	1	205.00	Demand	0.52	Pattern - 1	0.52	344.06	60.28
1540	1	205.00	Demand	2.59	Pattern - 1	2.59	344.06	60.28
170	1	205.00	Demand	1.55	Pattern - 1	1.55	344.15	60.33
360	1	205.00	Demand	1.03	Pattern - 1	1.03	344.27	60.37
110	1	205.00	Demand	7.76	Pattern - 1	7.76	344.32	60.40
460	1	205.00	Demand	1.03	Pattern - 1	1.03	344.36	60.42
480	1	205.00	Demand	1.55	Pattern - 1	1.55	344.39	60.43
260	1	205.00	Demand	5.17	Pattern - 1	5.17	344.40	60.43
930	1	205.00	Demand	1.55	Pattern - 1	1.55	344.52	60.48
100	1	205.00	Demand	8.79	Pattern - 1	8.79	344.58	60.51
570	1	205.00	Demand	0.52	Pattern - 1	0.52	344.70	60.56
590	1	205.00	Demand	0.00	Pattern - 1	0.00	344.71	60.57
310	1	205.00	Demand	1.03	Pattern - 1	1.03	345.09	60.73
70	1	205.00	Demand	0.52	Pattern - 1	0.52	345.09	60.73
300	1	205.00	Demand	0.52	Pattern - 1	0.52	345.13	60.75
60	1	205.00	Demand	1.03	Pattern - 1	1.03	345.14	60.75
660	1	205.00	Demand	4.14	Pattern - 1	4.14	345.18	60.77
J-5	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.48	61.34
J-1	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.48	61.34
J-3	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.48	61.34
1500	1	200.00	Demand	2.59	Pattern - 1	2.59	344.06	62.45
1510	1	200.00	Demand	6.21	Pattern - 1	6.21	344.06	62.45
1530	1	200.00	Demand	1.55	Pattern - 1	1.55	344.06	62.45
1600	1	200.00	Demand	3.10	Pattern - 1	3.10	344.13	62.48
240	1	200.00	Demand	3.62	Pattern - 1	3.62	344.16	62.50
250	1	200.00	Demand	7.76	Pattern - 1	7.76	344.33	62.57
90	1	200.00	Demand	2.07	Pattern - 1	2.07	344.69	62.73
900	1	200.00	Demand	3.10	Pattern - 1	3.10	344.80	62.77
890	1	200.00	Demand	3.10	Pattern - 1	3.10	344.82	62.78
880	1	200.00	Demand	3.10	Pattern - 1	3.10	344.82	62.78
610	1	200.00	Demand	1.03	Pattern - 1	1.03	344.85	62.79
630	1	200.00	Demand	0.52	Pattern - 1	0.52	344.87	62.80
670	1	200.00	Demand	1.55	Pattern - 1	1.55	345.17	62.93
1420	1	195.00	Demand	1.03	Pattern - 1	1.03	343.92	64.56
210	1	195.00	Demand	3.10	Pattern - 1	3.10	344.14	64.65
190	1	195.00	Demand	5.69	Pattern - 1	5.69	344.14	64.65
970	1	195.00	Demand	2.07	Pattern - 1	2.07	344.33	64.74
960	1	195.00	Demand	1.55	Pattern - 1	1.55	344.37	64.76
840	1	195.00	Demand	2.07	Pattern - 1	2.07	344.72	64.91
1470	1	190.00	Demand	0.52	Pattern - 1	0.52	344.02	66.77
1610	1	190.00	Demand	0.52	Pattern - 1	0.52	344.04	66.78
200	1	190.00	Demand	3.62	Pattern - 1	3.62	344.14	66.82
180	1	190.00	Demand	1.55	Pattern - 1	1.55	344.14	66.82
340	1	190.00	Demand	3.10	Pattern - 1	3.10	344.33	66.90
950	1	190.00	Demand	5.69	Pattern - 1	5.69	344.33	66.91
350	1	190.00	Demand	0.52	Pattern - 1	0.52	344.34	66.91

Scenario: WSP Year 2006
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
320	1	190.00	Demand	3.10	Pattern - 1	3.10	344.41	66.94
500	1	190.00	Demand	1.03	Pattern - 1	1.03	344.43	66.95
540	1	190.00	Demand	2.07	Pattern - 1	2.07	344.55	67.00
850	1	190.00	Demand	4.14	Pattern - 1	4.14	344.82	67.12
1320	1	185.00	Demand	1.55	Pattern - 1	1.55	343.78	68.84
1290	1	185.00	Demand	0.52	Pattern - 1	0.52	343.79	68.84
1280	1	185.00	Demand	0.52	Pattern - 1	0.52	343.79	68.84
1330	1	185.00	Demand	0.52	Pattern - 1	0.52	343.79	68.84
1310	1	185.00	Demand	0.00	Pattern - 1	0.00	343.79	68.84
1460	1	185.00	Demand	2.07	Pattern - 1	2.07	344.03	68.94
1430	1	185.00	Demand	4.65	Pattern - 1	4.65	344.03	68.94
430	1	185.00	Demand	3.62	Pattern - 1	3.62	344.13	68.98
580	1	185.00	Demand	2.59	Pattern - 1	2.59	344.62	69.20
860	1	185.00	Demand	2.07	Pattern - 1	2.07	344.79	69.27
620	1	185.00	Demand	2.07	Pattern - 1	2.07	344.80	69.28
1300	1	183.00	Demand	0.52	Pattern - 1	0.52	343.80	69.71
1340	1	183.00	Demand	1.03	Pattern - 1	1.03	343.80	69.71
1020	1	182.00	Demand	8.27	Pattern - 1	8.27	344.19	70.31
1270	1	180.00	Demand	1.03	Pattern - 1	1.03	343.78	71.00
1260	1	180.00	Demand	1.55	Pattern - 1	1.55	343.79	71.01
1350	1	180.00	Demand	1.03	Pattern - 1	1.03	343.80	71.01
1360	1	180.00	Demand	5.69	Pattern - 1	5.69	343.86	71.04
1410	1	180.00	Demand	1.55	Pattern - 1	1.55	343.95	71.07
1400	1	180.00	Demand	2.07	Pattern - 1	2.07	343.97	71.08
440	1	180.00	Demand	2.07	Pattern - 1	2.07	344.12	71.15
1440	1	180.00	Demand	3.62	Pattern - 1	3.62	344.13	71.15
220	1	180.00	Demand	1.55	Pattern - 1	1.55	344.14	71.16
420	1	180.00	Demand	1.55	Pattern - 1	1.55	344.14	71.16
230	1	180.00	Demand	0.00	Pattern - 1	0.00	344.15	71.16
1011	1	180.00	Demand	8.79	Pattern - 1	8.79	344.19	71.18
330	1	180.00	Demand	2.07	Pattern - 1	2.07	344.34	71.25
520	1	180.00	Demand	1.55	Pattern - 1	1.55	344.48	71.30
1250	1	175.00	Demand	1.03	Pattern - 1	1.03	343.79	73.17
1230	1	175.00	Demand	1.03	Pattern - 1	1.03	343.79	73.17
1240	1	175.00	Demand	0.52	Pattern - 1	0.52	343.79	73.17
1220	1	175.00	Demand	1.55	Pattern - 1	1.55	343.79	73.18
80	1	175.00	Demand	0.52	Pattern - 1	0.52	344.96	73.68
1200	1	170.00	Demand	0.52	Pattern - 1	0.52	343.84	75.36
1210	1	170.00	Demand	0.00	Pattern - 1	0.00	343.84	75.36
1180	1	170.00	Demand	0.52	Pattern - 1	0.52	343.85	75.37
1170	1	170.00	Demand	0.00	Pattern - 1	0.00	343.86	75.37
1110	1	170.00	Demand	0.00	Pattern - 1	0.00	343.88	75.38
1450	1	170.00	Demand	2.07	Pattern - 1	2.07	344.11	75.48
1000	1	170.00	Demand	3.62	Pattern - 1	3.62	344.19	75.51
980	1	170.00	Demand	0.52	Pattern - 1	0.52	344.19	75.52
910	1	170.00	Demand	1.03	Pattern - 1	1.03	344.77	75.77
1380	1	162.00	Demand	4.65	Pattern - 1	4.65	343.90	78.86
1190	1	160.00	Demand	0.52	Pattern - 1	0.52	343.85	79.70
1150	1	160.00	Demand	2.59	Pattern - 1	2.59	343.86	79.71
1160	1	160.00	Demand	0.00	Pattern - 1	0.00	343.86	79.71
1140	1	160.00	Demand	0.52	Pattern - 1	0.52	343.86	79.71

Scenario: WSP Year 2006
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
1130	1	160.00	Demand	1.55	Pattern - 1	1.55	343.86	79.71
1120	1	160.00	Demand	0.00	Pattern - 1	0.00	343.88	79.72
1100	1	160.00	Demand	0.00	Pattern - 1	0.00	343.88	79.72
1070	1	160.00	Demand	0.00	Pattern - 1	0.00	343.88	79.72
1090	1	160.00	Demand	0.00	Pattern - 1	0.00	343.88	79.72
1080	1	160.00	Demand	0.00	Pattern - 1	0.00	343.88	79.72
1370	1	160.00	Demand	6.21	Pattern - 1	6.21	343.89	79.72
1050	1	160.00	Demand	0.00	Pattern - 1	0.00	343.89	79.72
1390	1	160.00	Demand	1.03	Pattern - 1	1.03	343.90	79.72
J990	1	160.00	Demand	0.00	Pattern - 1	0.00	344.19	79.85
920	1	160.00	Demand	1.55	Pattern - 1	1.55	344.64	80.05
1060	1	155.00	Demand	1.03	Pattern - 1	1.03	343.88	81.88
1040	1	155.00	Demand	0.00	Pattern - 1	0.00	343.89	81.89
1030	1	155.00	Demand	2.07	Pattern - 1	2.07	343.90	81.89

Scenario: WSP Year 2026 (PitP)
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
1590	1	260.00	Demand	1.00	Pattern - 1	1.00	340.92	35.08
400	1	250.00	Demand	3.01	Pattern - 1	3.01	340.86	39.39
390	1	240.00	Demand	1.00	Pattern - 1	1.00	340.90	43.74
410	1	240.00	Demand	5.77	Pattern - 1	5.77	340.91	43.75
380	1	235.00	Demand	7.01	Pattern - 1	7.01	340.43	45.71
640	1	230.00	Demand	5.01	Pattern - 1	5.01	343.08	49.02
290	1	230.00	Demand	1.00	Pattern - 1	1.00	345.08	49.89
20	1	230.00	Demand	1.00	Pattern - 1	1.00	345.09	49.89
10	1	230.00	Demand	0.00	Pattern - 1	0.00	345.34	50.00
870	1	227.00	Demand	14.03	Pattern - 1	14.03	343.99	50.72
J-2	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.05	50.74
J-6	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.05	50.74
J-4	Zone-1	234.00	Demand	0.00	Fixed	0.00	351.05	50.74
600	1	225.00	Demand	3.01	Pattern - 1	3.01	342.74	51.04
30	1	225.00	Demand	1.00	Pattern - 1	1.00	344.86	51.96
160	1	220.00	Demand	4.01	Pattern - 1	4.01	340.96	52.44
560	1	220.00	Demand	2.00	Pattern - 1	2.00	342.41	53.07
820	1	220.00	Demand	2.00	Pattern - 1	2.00	343.26	53.44
810	1	220.00	Demand	1.00	Pattern - 1	1.00	343.28	53.44
800	1	220.00	Demand	3.01	Pattern - 1	3.01	343.32	53.46
790	1	220.00	Demand	1.00	Pattern - 1	1.00	343.36	53.48
780	1	220.00	Demand	2.00	Pattern - 1	2.00	343.45	53.52
770	1	220.00	Demand	2.00	Pattern - 1	2.00	343.47	53.53
760	1	220.00	Demand	4.01	Pattern - 1	4.01	343.50	53.54
750	1	220.00	Demand	1.00	Pattern - 1	1.00	343.60	53.58
740	1	220.00	Demand	3.01	Pattern - 1	3.01	343.73	53.64
730	1	220.00	Demand	3.01	Pattern - 1	3.01	343.77	53.65
710	1	220.00	Demand	2.00	Pattern - 1	2.00	344.15	53.82
720	1	220.00	Demand	2.00	Pattern - 1	2.00	344.15	53.82
700	1	220.00	Demand	2.00	Pattern - 1	2.00	344.18	53.83
690	1	220.00	Demand	2.00	Pattern - 1	2.00	344.52	53.98
680	1	220.00	Demand	2.00	Pattern - 1	2.00	344.54	53.99
370	1	215.00	Demand	4.01	Pattern - 1	4.01	341.00	54.62
1580	1	210.00	Demand	2.00	Pattern - 1	2.00	340.39	56.53
1560	1	210.00	Demand	5.01	Pattern - 1	5.01	340.40	56.53
1570	1	210.00	Demand	5.01	Pattern - 1	5.01	340.41	56.53
1520	1	210.00	Demand	5.01	Pattern - 1	5.01	340.51	56.58
150	1	210.00	Demand	8.02	Pattern - 1	8.02	341.02	56.80
120	1	210.00	Demand	6.01	Pattern - 1	6.01	341.34	56.94
940	1	210.00	Demand	16.03	Pattern - 1	16.03	341.40	56.97
270	1	210.00	Demand	3.01	Pattern - 1	3.01	342.05	57.25
510	1	210.00	Demand	4.01	Pattern - 1	4.01	342.11	57.27
530	1	210.00	Demand	1.00	Pattern - 1	1.00	342.40	57.40
550	1	210.00	Demand	1.00	Pattern - 1	1.00	342.44	57.42
140	1	208.00	Demand	4.01	Pattern - 1	4.01	341.10	57.70
830	1	210.00	Demand	8.02	Pattern - 1	8.02	343.19	57.74
130	1	208.00	Demand	6.01	Pattern - 1	6.01	341.20	57.75
450	1	208.00	Demand	3.01	Pattern - 1	3.01	341.65	57.94
470	1	208.00	Demand	2.00	Pattern - 1	2.00	341.73	57.98
490	1	208.00	Demand	1.00	Pattern - 1	1.00	341.91	58.05
650	1	210.00	Demand	7.01	Pattern - 1	7.01	344.43	58.28

Scenario: WSP Year 2026
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
280	1	210.00	Demand	7.01	Pattern - 1	7.01	344.55	58.33
50	1	210.00	Demand	3.01	Pattern - 1	3.01	344.56	58.33
40	1	210.00	Demand	3.01	Pattern - 1	3.01	344.63	58.36
1480	1	205.00	Demand	6.01	Pattern - 1	6.01	340.49	58.74
1490	1	205.00	Demand	5.01	Pattern - 1	5.01	340.58	58.78
1550	1	205.00	Demand	1.00	Pattern - 1	1.00	340.59	58.78
1540	1	205.00	Demand	5.01	Pattern - 1	5.01	340.59	58.78
170	1	205.00	Demand	2.98	Pattern - 1	2.98	340.91	58.92
360	1	205.00	Demand	2.00	Pattern - 1	2.00	341.30	59.09
110	1	205.00	Demand	15.03	Pattern - 1	15.03	341.49	59.17
460	1	205.00	Demand	2.00	Pattern - 1	2.00	341.62	59.23
480	1	205.00	Demand	3.01	Pattern - 1	3.01	341.71	59.27
260	1	205.00	Demand	10.02	Pattern - 1	10.02	341.75	59.28
930	1	205.00	Demand	3.01	Pattern - 1	3.01	342.17	59.46
100	1	205.00	Demand	17.03	Pattern - 1	17.03	342.36	59.55
570	1	205.00	Demand	1.00	Pattern - 1	1.00	342.76	59.72
590	1	205.00	Demand	0.00	Pattern - 1	0.00	342.82	59.75
310	1	205.00	Demand	2.00	Pattern - 1	2.00	344.11	60.31
70	1	205.00	Demand	1.00	Pattern - 1	1.00	344.12	60.31
300	1	205.00	Demand	1.00	Pattern - 1	1.00	344.25	60.37
60	1	205.00	Demand	2.00	Pattern - 1	2.00	344.26	60.37
660	1	205.00	Demand	8.02	Pattern - 1	8.02	344.41	60.44
1500	1	200.00	Demand	5.01	Pattern - 1	5.01	340.59	60.95
1510	1	200.00	Demand	12.02	Pattern - 1	12.02	340.61	60.96
1530	1	200.00	Demand	3.01	Pattern - 1	3.01	340.62	60.96
1600	1	200.00	Demand	6.01	Pattern - 1	6.01	340.84	61.06
240	1	200.00	Demand	7.01	Pattern - 1	7.01	340.93	61.10
J-3	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.41	61.30
J-5	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.41	61.30
J-1	Zone-1	234.00	Demand	0.00	Fixed	0.00	375.41	61.30
250	1	200.00	Demand	15.03	Pattern - 1	15.03	341.53	61.36
90	1	200.00	Demand	4.01	Pattern - 1	4.01	342.76	61.89
900	1	200.00	Demand	6.01	Pattern - 1	6.01	343.10	62.04
890	1	200.00	Demand	6.01	Pattern - 1	6.01	343.17	62.07
880	1	200.00	Demand	6.01	Pattern - 1	6.01	343.18	62.07
610	1	200.00	Demand	2.00	Pattern - 1	2.00	343.28	62.11
630	1	200.00	Demand	1.00	Pattern - 1	1.00	343.35	62.14
670	1	200.00	Demand	3.01	Pattern - 1	3.01	344.38	62.59
1420	1	195.00	Demand	2.00	Pattern - 1	2.00	340.12	62.91
210	1	195.00	Demand	6.01	Pattern - 1	6.01	340.87	63.24
190	1	195.00	Demand	11.02	Pattern - 1	11.02	340.87	63.24
970	1	195.00	Demand	4.01	Pattern - 1	4.01	341.51	63.51
960	1	195.00	Demand	3.01	Pattern - 1	3.01	341.67	63.58
840	1	195.00	Demand	4.01	Pattern - 1	4.01	342.86	64.10
1470	1	190.00	Demand	1.00	Pattern - 1	1.00	340.47	65.23
1610	1	190.00	Demand	1.00	Pattern - 1	1.00	340.53	65.26
200	1	190.00	Demand	7.01	Pattern - 1	7.01	340.87	65.40
180	1	190.00	Demand	3.01	Pattern - 1	3.01	340.88	65.41
340	1	190.00	Demand	6.01	Pattern - 1	6.01	341.51	65.68
950	1	190.00	Demand	11.02	Pattern - 1	11.02	341.52	65.69
350	1	190.00	Demand	1.00	Pattern - 1	1.00	341.56	65.70

Scenario: WSP Year 2026
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
320	1	190.00	Demand	6.01	Pattern - 1	6.01	341.78	65.80
500	1	190.00	Demand	2.00	Pattern - 1	2.00	341.87	65.84
540	1	190.00	Demand	4.01	Pattern - 1	4.01	342.27	66.01
850	1	190.00	Demand	8.02	Pattern - 1	8.02	343.18	66.41
1320	1	185.00	Demand	3.01	Pattern - 1	3.01	339.66	67.05
1290	1	185.00	Demand	1.00	Pattern - 1	1.00	339.68	67.06
1280	1	185.00	Demand	1.00	Pattern - 1	1.00	339.68	67.06
1330	1	185.00	Demand	1.00	Pattern - 1	1.00	339.68	67.06
1310	1	185.00	Demand	0.00	Pattern - 1	0.00	339.69	67.06
1460	1	185.00	Demand	4.01	Pattern - 1	4.01	340.48	67.40
1430	1	185.00	Demand	9.02	Pattern - 1	9.02	340.48	67.41
430	1	185.00	Demand	7.01	Pattern - 1	7.01	340.82	67.55
1300	1	183.00	Demand	1.00	Pattern - 1	1.00	339.70	67.93
1340	1	183.00	Demand	2.00	Pattern - 1	2.00	339.72	67.94
580	1	185.00	Demand	5.01	Pattern - 1	5.01	342.51	68.29
860	1	185.00	Demand	4.01	Pattern - 1	4.01	343.08	68.53
620	1	185.00	Demand	4.01	Pattern - 1	4.01	343.11	68.54
1020	1	182.00	Demand	16.03	Pattern - 1	16.03	341.03	68.94
1270	1	180.00	Demand	2.00	Pattern - 1	2.00	339.65	69.21
1260	1	180.00	Demand	3.01	Pattern - 1	3.01	339.68	69.22
1350	1	180.00	Demand	2.00	Pattern - 1	2.00	339.70	69.23
1360	1	180.00	Demand	11.02	Pattern - 1	11.02	339.93	69.33
1410	1	180.00	Demand	3.01	Pattern - 1	3.01	340.21	69.45
1400	1	180.00	Demand	4.01	Pattern - 1	4.01	340.29	69.49
440	1	180.00	Demand	4.01	Pattern - 1	4.01	340.80	69.71
1440	1	180.00	Demand	7.01	Pattern - 1	7.01	340.85	69.73
220	1	180.00	Demand	3.01	Pattern - 1	3.01	340.87	69.74
420	1	180.00	Demand	3.01	Pattern - 1	3.01	340.88	69.74
230	1	180.00	Demand	0.00	Pattern - 1	0.00	340.91	69.76
1011	1	180.00	Demand	17.03	Pattern - 1	17.03	341.03	69.81
330	1	180.00	Demand	4.01	Pattern - 1	4.01	341.56	70.04
520	1	180.00	Demand	3.01	Pattern - 1	3.01	342.02	70.24
1250	1	175.00	Demand	2.00	Pattern - 1	2.00	339.66	71.38
1230	1	175.00	Demand	2.00	Pattern - 1	2.00	339.67	71.39
1240	1	175.00	Demand	1.00	Pattern - 1	1.00	339.68	71.39
1220	1	175.00	Demand	3.01	Pattern - 1	3.01	339.70	71.40
80	1	175.00	Demand	1.00	Pattern - 1	1.00	343.67	73.12
1210	1	170.00	Demand	0.50	Pattern - 1	0.50	339.84	73.63
1200	1	170.00	Demand	0.50	Pattern - 1	0.50	339.84	73.63
1180	1	170.00	Demand	1.00	Pattern - 1	1.00	339.89	73.65
1170	1	170.00	Demand	0.00	Pattern - 1	0.00	339.90	73.66
1110	1	170.00	Demand	0.00	Pattern - 1	0.00	340.00	73.70
1450	1	170.00	Demand	4.01	Pattern - 1	4.01	340.75	74.03
1000	1	170.00	Demand	7.01	Pattern - 1	7.01	341.03	74.15
980	1	170.00	Demand	1.00	Pattern - 1	1.00	341.05	74.15
910	1	170.00	Demand	2.00	Pattern - 1	2.00	343.03	75.01
1380	1	162.00	Demand	9.02	Pattern - 1	9.02	340.07	77.20
1190	1	160.00	Demand	1.00	Pattern - 1	1.00	339.88	77.98
1150	1	160.00	Demand	5.01	Pattern - 1	5.01	339.90	77.99
1160	1	160.00	Demand	0.00	Pattern - 1	0.00	339.90	77.99
1140	1	160.00	Demand	1.00	Pattern - 1	1.00	339.92	78.00

Scenario: WSP Year 2026
Steady State Analysis
Junction Report

Label	Zone	Elevation (ft)	Type	Base Flow (gpm)	Pattern	Demand (Calculated) (gpm)	Calculated Hydraulic Grade (ft)	Pressure (psi)
1130	1	160.00	Demand	3.01	Pattern - 1	3.01	339.93	78.00
1120	1	160.00	Demand	0.00	Pattern - 1	0.00	340.00	78.03
1100	1	160.00	Demand	0.00	Pattern - 1	0.00	340.00	78.03
1070	1	160.00	Demand	0.00	Pattern - 1	0.00	340.00	78.03
1090	1	160.00	Demand	0.00	Pattern - 1	0.00	340.00	78.03
1080	1	160.00	Demand	0.00	Pattern - 1	0.00	340.00	78.03
1370	1	160.00	Demand	12.02	Pattern - 1	12.02	340.03	78.05
1050	1	160.00	Demand	0.00	Pattern - 1	0.00	340.03	78.05
1390	1	160.00	Demand	2.00	Pattern - 1	2.00	340.06	78.06
J990	1	160.00	Demand	0.00	Pattern - 1	0.00	341.05	78.49
920	1	160.00	Demand	3.01	Pattern - 1	3.01	342.58	79.15
1060	1	155.00	Demand	2.00	Pattern - 1	2.00	340.00	80.20
1040	1	155.00	Demand	0.00	Pattern - 1	0.00	340.03	80.22
1030	1	155.00	Demand	4.01	Pattern - 1	4.01	340.04	80.22

* Does Not Meet FF

50 PSI Sys

Scenario: WSP Year 2006 (MDD)
Fire Flow Analysis (50 psi)
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
10	230.00	true	0.00	0.00	50.07	1,000.00	1,200.00	20.00	49.78	20.00	36.62	1590
20	230.00	true	0.26	0.26	50.06	1,000.00	1,200.00	20.00	48.38	20.00	35.51	1590
30	225.00	true	0.26	0.26	52.22	1,000.00	1,200.00	20.00	49.52	20.00	34.73	1590
40	210.00	true	0.78	0.78	58.71	1,000.00	1,200.00	20.00	54.44	20.00	33.63	1590
50	210.00	true	0.78	0.78	58.71	1,000.00	1,200.00	20.00	53.45	20.00	33.04	1590
60	205.00	true	0.52	0.52	60.86	1,000.00	1,200.00	20.00	50.68	20.00	30.18	1590
70	205.00	true	0.26	0.26	60.86	1,000.00	1,200.00	20.00	48.54	20.00	28.96	1590
80	175.00	true	0.26	0.26	73.85	1,000.00	1,200.00	20.00	55.32	20.00	25.41	1590
90	200.00	true	1.04	1.04	62.98	1,000.00	1,156.97	20.00	36.34	20.00	20.00	1590
100	205.00	true	4.44	4.44	60.80	1,000.00	1,065.09	20.00	34.89	20.00	20.00	1590
110	205.00	false	3.92	3.92	60.77	1,000.00	880.63	20.00	37.51	20.00	20.00	1590
120	210.00	false	1.57	1.57	58.59	1,000.00	844.07	20.00	36.15	20.00	20.00	1590
130	208.00	false	1.57	1.57	59.45	1,000.00	807.56	20.00	37.95	20.00	20.00	1590
140	208.00	false	1.04	1.04	59.45	1,000.00	775.13	20.00	38.90	20.00	20.00	1590
150	210.00	false	2.09	2.09	58.58	1,000.00	745.94	20.00	39.01	20.00	20.00	1590
160	220.00	false	1.04	1.04	54.24	1,000.00	701.58	20.00	36.41	20.00	20.00	1590
170	205.00	false	0.78	0.78	60.74	1,000.00	699.92	20.00	43.05	20.00	20.00	1590
180	190.00	false	0.78	0.78	67.25	1,000.00	742.61	20.00	48.00	20.00	20.00	1590
190	195.00	false	2.87	2.87	65.08	1,000.00	767.57	20.00	45.03	20.00	20.00	1590
200	190.00	false	1.83	1.83	67.25	1,000.00	800.77	20.00	46.26	20.00	20.00	1590
210	195.00	false	1.57	1.57	65.08	1,000.00	830.41	20.00	43.36	20.00	20.00	1590
220	180.00	false	0.78	0.78	71.58	1,000.00	871.67	20.00	48.98	20.00	20.00	1590
230	180.00	true	0.00	0.00	71.58	1,000.00	1,013.72	20.00	46.83	20.00	20.00	1590
240	200.00	true	1.83	1.83	62.91	1,000.00	1,101.07	20.00	37.09	20.00	20.00	1590
250	200.00	true	3.92	3.92	62.93	1,000.00	1,200.00	20.00	38.94	20.00	25.47	1590
260	205.00	true	2.61	2.61	60.77	1,000.00	1,200.00	20.00	39.19	20.00	27.53	1590
270	210.00	true	0.78	0.78	58.62	1,000.00	1,200.00	20.00	45.13	20.00	29.45	1590
280	210.00	true	1.83	1.83	58.71	1,000.00	1,200.00	20.00	55.27	20.00	34.78	1590
290	230.00	false	0.26	0.26	50.06	1,000.00	203.08	20.00	20.00	20.00	36.83	1590
300	205.00	false	0.26	0.26	60.86	1,000.00	205.41	20.00	20.00	20.00	36.51	1590
310	205.00	false	0.52	0.52	60.86	1,000.00	249.74	20.00	20.00	20.00	36.26	1590
320	190.00	false	1.57	1.57	67.28	1,000.00	529.82	20.00	20.00	20.00	31.33	1590
330	180.00	false	1.04	1.04	71.61	1,000.00	450.08	20.00	24.34	20.00	20.00	350
340	190.00	false	1.57	1.57	67.27	1,000.00	550.85	20.00	20.00	20.00	29.05	350
350	190.00	false	0.26	0.26	67.27	1,000.00	192.79	20.00	20.00	20.00	35.74	1590
360	205.00	false	0.52	0.52	60.76	1,000.00	126.42	20.00	20.00	20.00	36.11	1590
370	215.00	false	1.04	1.04	56.41	1,000.00	100.48	20.00	20.00	20.00	36.30	1590
380	235.00	false	1.83	1.83	47.72	1,000.00	80.00	20.00	20.00	20.00	36.44	1590
390	240.00	false	0.26	0.26	45.57	1,000.00	95.07	20.00	20.00	20.00	36.29	1590
400	250.00	false	0.78	0.78	41.23	1,000.00	105.16	20.00	20.00	20.00	36.20	1590
410	240.00	false	1.50	1.50	45.57	1,000.00	237.38	20.00	24.34	20.00	20.00	400
420	180.00	false	0.78	0.78	71.58	1,000.00	742.61	20.00	50.62	20.00	20.00	1590
430	185.00	false	1.83	1.83	69.41	1,000.00	618.92	20.00	20.00	20.00	22.17	440
440	180.00	false	1.04	1.04	71.58	1,000.00	327.80	20.00	20.00	20.00	33.57	1590
450	208.00	false	0.78	0.78	59.47	1,000.00	872.88	20.00	20.00	20.00	21.30	460
460	205.00	false	0.52	0.52	60.77	1,000.00	177.78	20.00	20.00	20.00	36.38	1590
470	208.00	false	0.52	0.52	59.47	1,000.00	798.27	20.00	20.00	20.00	21.30	480
480	205.00	false	0.78	0.78	60.77	1,000.00	236.72	20.00	20.00	20.00	36.20	1590
490	208.00	false	0.26	0.26	59.48	1,000.00	749.42	20.00	20.00	20.00	26.16	510
500	190.00	false	0.52	0.52	67.28	1,000.00	155.29	20.00	20.00	20.00	36.52	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
510	210.00	false	1.04	1.04	58.62	1,000.00	728.61	20.00	20.00	20.00	24.73	560
520	180.00	false	0.78	0.78	71.62	1,000.00	143.10	20.00	20.00	20.00	36.59	1590
530	210.00	false	0.26	0.26	58.63	1,000.00	710.49	20.00	23.34	20.00	20.00	560
540	190.00	false	1.04	1.04	67.30	1,000.00	146.64	20.00	20.00	20.00	36.61	1590
550	210.00	false	0.26	0.26	58.63	1,000.00	702.88	20.00	24.34	20.00	20.00	560
560	220.00	false	0.52	0.52	54.30	1,000.00	144.99	20.00	20.00	20.00	36.62	1590
570	205.00	false	0.26	0.26	60.81	1,000.00	733.43	20.00	27.40	20.00	20.00	600
580	185.00	false	1.31	1.31	69.47	1,000.00	132.81	20.00	20.00	20.00	36.66	1590
590	205.00	false	0.00	0.00	60.81	1,000.00	725.47	20.00	28.67	20.00	20.00	600
600	225.00	false	0.78	0.78	52.14	1,000.00	119.36	20.00	20.00	20.00	36.69	1590
610	200.00	false	0.52	0.52	63.00	1,000.00	810.44	20.00	31.16	20.00	20.00	640
620	185.00	false	1.04	1.04	69.49	1,000.00	133.56	20.00	20.00	20.00	36.69	1590
630	200.00	false	0.26	0.26	63.00	1,000.00	800.65	20.00	33.02	20.00	20.00	640
640	230.00	false	1.31	1.31	49.98	1,000.00	97.35	20.00	20.00	20.00	36.76	1590
650	210.00	false	1.83	1.83	58.70	1,000.00	588.39	20.00	20.00	20.00	22.17	660
660	205.00	false	2.09	2.09	60.87	1,000.00	528.90	20.00	20.00	20.00	22.17	670
670	200.00	false	0.78	0.78	63.04	1,000.00	215.34	20.00	20.00	20.00	36.67	1590
680	220.00	true	0.52	0.52	54.37	1,000.00	1,200.00	20.00	26.20	20.00	26.20	690
690	220.00	false	0.52	0.52	54.37	1,000.00	175.82	20.00	20.00	20.00	36.79	1590
700	220.00	false	0.52	0.52	54.36	1,000.00	992.12	20.00	20.00	20.00	20.00	710
710	220.00	false	0.52	0.52	54.36	1,000.00	142.38	20.00	20.00	20.00	36.80	1590
720	220.00	false	0.52	0.52	54.36	1,000.00	149.19	20.00	20.00	20.00	36.79	1590
730	220.00	false	0.78	0.78	54.34	1,000.00	854.40	20.00	20.00	20.00	20.00	740
740	220.00	false	0.78	0.78	54.34	1,000.00	181.45	20.00	20.00	20.00	36.75	1590
750	220.00	false	0.26	0.26	54.34	1,000.00	831.99	20.00	20.00	20.00	20.00	760
760	220.00	false	1.04	1.04	54.33	1,000.00	139.41	20.00	20.00	20.00	36.78	1590
770	220.00	false	0.52	0.52	54.33	1,000.00	830.73	20.00	20.00	20.00	20.00	780
780	220.00	false	0.52	0.52	54.33	1,000.00	181.32	20.00	20.00	20.00	36.73	1590
790	220.00	false	0.26	0.26	54.33	1,000.00	854.30	20.00	20.00	20.00	20.00	800
800	220.00	false	0.78	0.78	54.33	1,000.00	191.70	20.00	20.00	20.00	36.71	1590
810	220.00	false	0.26	0.26	54.33	1,000.00	905.98	20.00	20.00	20.00	20.00	820
820	220.00	false	0.52	0.52	54.33	1,000.00	192.60	20.00	20.00	20.00	36.70	1590
830	210.00	true	2.09	2.09	58.66	1,000.00	1,149.82	20.00	20.00	20.00	20.99	820
840	195.00	false	1.04	1.04	65.15	1,000.00	87.85	20.00	20.00	20.00	36.81	1590
850	190.00	true	2.09	2.09	67.33	1,000.00	1,200.00	20.00	35.38	20.00	28.26	820
860	185.00	false	1.04	1.04	69.49	1,000.00	171.90	20.00	20.00	20.00	36.71	1590
870	227.00	true	3.66	3.66	51.32	1,000.00	1,200.00	20.00	35.80	20.00	34.61	1590
880	200.00	true	1.57	1.57	62.99	1,000.00	1,200.00	20.00	38.15	20.00	34.24	1590
890	200.00	true	1.57	1.57	62.99	1,000.00	1,200.00	20.00	37.86	20.00	34.23	1590
900	200.00	true	1.57	1.57	62.99	1,000.00	1,200.00	20.00	35.82	20.00	34.14	1590
910	170.00	false	0.52	0.52	75.99	1,000.00	78.61	20.00	20.00	20.00	36.82	1590
920	160.00	false	0.78	0.78	80.31	1,000.00	60.59	20.00	20.00	20.00	36.84	1590
930	205.00	true	0.78	0.78	60.79	1,000.00	1,113.85	20.00	20.00	20.00	33.25	1590
940	210.00	false	4.18	4.18	58.59	1,000.00	453.45	20.00	20.00	20.00	35.55	1590
950	190.00	true	2.87	2.87	67.27	1,000.00	1,200.00	20.00	48.74	20.00	29.23	1590
960	195.00	true	0.78	0.78	65.11	1,000.00	1,001.51	20.00	20.01	20.00	20.00	970
970	195.00	false	1.04	1.04	65.10	1,000.00	128.74	20.00	20.00	20.00	36.66	1590
980	170.00	true	0.26	0.26	75.92	1,000.00	1,200.00	20.00	33.10	20.00	30.27	1590
1000	170.00	true	1.83	1.83	75.92	1,000.00	1,200.00	20.00	34.89	20.00	30.20	1590
1010	180.00	true	4.44	4.44	71.59	1,000.00	1,200.00	20.00	32.67	20.00	30.05	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1020	182.00	true	4.18	4.18	70.72	1,000.00	1,200.00	20.00	47.81	20.00	29.23	1590
1030	155.00	false	1.04	1.04	82.39	1,000.00	845.67	20.00	22.57	20.00	20.00	1110
1040	155.00	false	0.00	0.00	82.39	1,000.00	837.28	20.00	22.80	20.00	20.00	1110
1050	160.00	false	0.00	0.00	80.22	1,000.00	174.46	20.00	20.00	20.00	36.44	1590
1060	155.00	false	0.52	0.52	82.39	1,000.00	746.93	20.00	26.50	20.00	20.00	1110
1070	160.00	false	0.00	0.00	80.22	1,000.00	155.66	20.00	24.34	20.00	20.00	1110
1080	160.00	false	0.00	0.00	80.22	1,000.00	128.49	20.00	20.00	20.00	20.00	1090
1090	160.00	false	0.00	0.00	80.22	1,000.00	112.39	20.00	20.00	20.00	33.17	1080
1100	160.00	false	0.00	0.00	80.22	1,000.00	108.37	20.00	24.34	20.00	20.00	1110
1110	170.00	false	0.00	0.00	75.88	1,000.00	92.69	20.00	20.00	20.00	36.69	1590
1120	160.00	false	0.00	0.00	80.22	1,000.00	89.81	20.00	20.00	20.00	36.35	1110
1130	160.00	false	0.78	0.78	80.22	1,000.00	727.44	20.00	20.00	20.00	20.00	1140
1140	160.00	false	0.26	0.26	80.22	1,000.00	218.60	20.00	20.00	20.00	36.28	1590
1150	160.00	false	1.31	1.31	80.22	1,000.00	748.40	20.00	20.00	20.00	20.00	1160
1160	160.00	false	0.00	0.00	80.22	1,000.00	110.87	20.00	20.00	20.00	36.64	1590
1170	170.00	false	0.00	0.00	75.88	1,000.00	772.48	20.00	20.15	20.00	20.00	1270
1180	170.00	false	0.26	0.26	75.88	1,000.00	728.02	20.00	20.00	20.00	20.74	1200
1190	160.00	false	0.26	0.26	80.22	1,000.00	171.44	20.00	20.00	20.00	36.45	1590
1200	170.00	false	0.26	0.26	75.88	1,000.00	602.64	20.00	20.00	20.00	20.00	1210
1210	170.00	false	0.00	0.00	75.88	1,000.00	229.10	20.00	20.00	20.00	36.24	1590
1220	175.00	false	0.78	0.78	73.71	1,000.00	447.72	20.00	20.00	20.00	20.00	1230
1230	175.00	false	0.52	0.52	73.71	1,000.00	187.38	20.00	20.00	20.00	36.39	1590
1240	175.00	false	0.26	0.26	73.71	1,000.00	433.51	20.00	20.00	20.00	20.00	1250
1250	175.00	false	0.52	0.52	73.71	1,000.00	190.70	20.00	20.00	20.00	36.36	1590
1260	180.00	false	0.78	0.78	71.54	1,000.00	406.84	20.00	20.00	20.00	20.00	1270
1270	180.00	false	0.52	0.52	71.54	1,000.00	178.32	20.00	20.00	20.00	36.42	1590
1280	185.00	false	0.26	0.26	69.37	1,000.00	395.47	20.00	20.00	20.00	20.00	1290
1290	185.00	false	0.26	0.26	69.37	1,000.00	207.06	20.00	20.00	20.00	36.32	1590
1300	183.00	false	0.26	0.26	70.24	1,000.00	424.35	20.00	20.87	20.00	20.00	1320
1310	185.00	false	0.00	0.00	69.37	1,000.00	338.14	20.00	20.00	20.00	20.00	1320
1320	185.00	false	0.78	0.78	69.37	1,000.00	196.27	20.00	20.00	20.00	36.36	1590
1330	185.00	false	0.26	0.26	69.37	1,000.00	205.54	20.00	20.00	20.00	36.33	1590
1340	183.00	false	0.52	0.52	70.24	1,000.00	442.84	20.00	20.00	20.00	20.64	1320
1350	180.00	false	0.52	0.52	71.54	1,000.00	214.57	20.00	20.00	20.00	36.29	1590
1360	180.00	false	2.87	2.87	71.55	1,000.00	794.92	20.00	21.69	20.00	20.00	1320
1370	160.00	false	3.13	3.13	80.22	1,000.00	802.60	20.00	20.00	20.00	32.60	1590
1380	162.00	false	2.35	2.35	79.36	1,000.00	818.52	20.00	20.00	20.00	20.87	1390
1390	160.00	false	0.52	0.52	80.22	1,000.00	285.05	20.00	20.00	20.00	36.01	1590
1400	180.00	true	1.04	1.04	71.56	1,000.00	1,082.84	20.00	26.38	20.00	20.00	1420
1410	180.00	false	0.78	0.78	71.56	1,000.00	959.50	20.00	26.51	20.00	20.00	1420
1420	195.00	false	0.52	0.52	65.05	1,000.00	86.31	20.00	20.00	20.00	36.70	1590
1430	185.00	true	2.35	2.35	69.40	1,000.00	1,200.00	20.00	28.01	20.00	24.13	1420
1440	180.00	true	1.83	1.83	71.58	1,000.00	1,200.00	20.00	41.88	20.00	29.12	1590
1450	170.00	false	1.04	1.04	75.91	1,000.00	196.96	20.00	20.00	20.00	36.36	1590
1460	185.00	false	1.04	1.04	69.40	1,000.00	790.27	20.00	22.17	20.00	20.00	1470
1470	190.00	false	0.26	0.26	67.23	1,000.00	120.96	20.00	20.00	20.00	36.56	1590
1480	205.00	false	1.57	1.57	60.73	1,000.00	753.09	20.00	20.00	20.00	32.00	1590
1490	205.00	false	1.31	1.31	60.73	1,000.00	776.50	20.00	20.00	20.00	26.91	1500
1500	200.00	false	1.31	1.31	62.90	1,000.00	758.38	20.00	20.00	20.00	27.14	1490
1510	200.00	false	3.13	3.13	62.90	1,000.00	745.58	20.00	20.00	20.00	28.64	1500

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1520	210.00	false	1.31	1.31	58.56	1,000.00	787.18	20.00	20.00	20.00	21.05	1580
1530	200.00	true	0.78	0.78	62.90	1,000.00	1,040.43	20.00	20.00	20.00	20.48	1520
1540	205.00	false	1.31	1.31	60.73	1,000.00	835.52	20.00	20.00	20.00	20.00	1550
1550	205.00	false	0.26	0.26	60.73	1,000.00	208.52	20.00	20.00	20.00	36.06	1590
1560	210.00	false	1.31	1.31	58.56	1,000.00	266.83	20.00	20.00	20.00	35.57	1590
1570	210.00	false	1.31	1.31	58.56	1,000.00	352.52	20.00	20.00	20.00	20.00	1580
1580	210.00	false	0.52	0.52	58.56	1,000.00	166.94	20.00	20.00	20.00	36.23	1590
1590	260.00	false	0.26	0.26	36.90	1,000.00	110.19	20.00	20.00	20.00	40.49	400
1600	200.00	false	1.57	1.57	62.91	1,000.00	438.35	20.00	20.00	20.00	30.73	1590
1610	190.00	false	0.26	0.26	67.23	1,000.00	190.00	20.00	20.00	20.00	35.98	1590
J-1	0.00	false	0.00	0.00	161.85	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-1
J-2	0.00	false	0.00	0.00	151.06	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-1
J-3	0.00	false	0.00	0.00	161.85	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-2
J-4	0.00	false	0.00	0.00	151.06	1,000.00	0.00	20.00	20.00	20.00	20.00	J-2
J-5	0.00	false	0.00	0.00	161.85	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-3
J-6	0.00	false	0.00	0.00	151.06	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-3
J990	160.00	false	0.00	0.00	80.26	1,000.00	205.34	20.00	20.00	20.00	36.40	1590

1500 FF w/ 60 PSI and 1psi System limit

Scenario: WSP Year 2006 (MDD)
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
10	230.00	true	0.00	0.00	60.08	1,000.00	1,200.00	20.00	59.80	1.00	46.63	1590
20	230.00	true	0.26	0.26	60.07	1,000.00	1,200.00	20.00	58.40	1.00	45.53	1590
30	225.00	true	0.26	0.26	62.23	1,000.00	1,200.00	20.00	59.54	1.00	44.75	1590
40	210.00	true	0.78	0.78	68.72	1,000.00	1,200.00	20.00	64.45	1.00	43.64	1590
50	210.00	true	0.78	0.78	68.72	1,000.00	1,200.00	20.00	63.47	1.00	43.05	1590
60	205.00	true	0.52	0.52	70.88	1,000.00	1,200.00	20.00	60.70	1.00	40.19	1590
70	205.00	true	0.26	0.26	70.87	1,000.00	1,200.00	20.00	58.56	1.00	38.97	1590
80	175.00	true	0.26	0.26	83.86	1,000.00	1,200.00	20.00	65.33	1.00	35.42	1590
90	200.00	true	1.04	1.04	72.99	1,000.00	1,200.00	20.00	44.54	1.00	28.90	1590
100	205.00	true	4.44	4.44	70.81	1,000.00	1,200.00	20.00	38.73	1.00	26.10	1590
110	205.00	true	3.92	3.92	70.78	1,000.00	1,200.00	20.00	30.34	1.00	17.47	400
120	210.00	true	1.57	1.57	68.61	1,000.00	1,200.00	20.00	26.52	1.00	14.78	400
130	208.00	true	1.57	1.57	69.47	1,000.00	1,200.00	20.00	25.84	1.00	11.73	400
140	208.00	true	1.04	1.04	69.46	1,000.00	1,200.00	20.00	24.65	1.00	8.67	400
150	210.00	true	2.09	2.09	68.59	1,000.00	1,200.00	20.00	22.92	1.00	5.57	400
160	220.00	true	1.04	1.04	64.26	1,000.00	1,168.88	20.00	20.00	1.00	5.07	1590
170	205.00	true	0.78	0.78	70.76	1,000.00	1,200.00	20.00	24.54	1.00	2.86	1590
180	190.00	true	0.78	0.78	77.26	1,000.00	1,200.00	20.00	32.00	1.00	7.36	1590
190	195.00	true	2.87	2.87	75.09	1,000.00	1,200.00	20.00	30.65	1.00	9.66	1590
200	190.00	true	1.83	1.83	77.26	1,000.00	1,200.00	20.00	34.12	1.00	12.40	1590
210	195.00	true	1.57	1.57	75.09	1,000.00	1,200.00	20.00	33.24	1.00	14.58	1590
220	180.00	true	0.78	0.78	81.60	1,000.00	1,200.00	20.00	41.64	1.00	17.27	1590
230	180.00	true	0.00	0.00	81.60	1,000.00	1,200.00	20.00	48.13	1.00	24.21	1590
240	200.00	true	1.83	1.83	72.93	1,000.00	1,200.00	20.00	42.79	1.00	27.26	1590
250	200.00	true	3.92	3.92	72.95	1,000.00	1,200.00	20.00	48.88	1.00	35.45	1590
260	205.00	true	2.61	2.61	70.79	1,000.00	1,200.00	20.00	49.11	1.00	37.49	1590
270	210.00	true	0.78	0.78	68.63	1,000.00	1,200.00	20.00	55.03	1.00	39.40	1590
280	210.00	true	1.83	1.83	68.72	1,000.00	1,200.00	20.00	65.28	1.00	44.79	1590
290	230.00	false	0.26	0.26	60.07	1,000.00	237.27	20.00	20.00	1.00	46.83	1590
300	205.00	false	0.26	0.26	70.88	1,000.00	231.31	20.00	20.00	1.00	46.44	1590
310	205.00	false	0.52	0.52	70.87	1,000.00	281.29	20.00	20.00	1.00	46.14	1590
320	190.00	false	1.57	1.57	77.29	1,000.00	588.62	20.00	20.00	1.00	36.15	350
330	180.00	false	1.04	1.04	81.62	1,000.00	520.36	20.00	20.00	1.00	15.66	350
340	190.00	false	1.57	1.57	77.28	1,000.00	612.05	20.00	20.00	1.00	31.00	350
350	190.00	false	0.26	0.26	77.28	1,000.00	214.03	20.00	20.00	1.00	45.55	1590
360	205.00	false	0.52	0.52	70.77	1,000.00	142.47	20.00	20.00	1.00	45.97	1590
370	215.00	false	1.04	1.04	66.43	1,000.00	114.76	20.00	20.00	1.00	46.19	1590
380	235.00	false	1.83	1.83	57.74	1,000.00	94.86	20.00	20.00	1.00	46.33	1590
390	240.00	false	0.26	0.26	55.58	1,000.00	113.84	20.00	20.00	1.00	45.55	400
400	250.00	false	0.78	0.78	51.25	1,000.00	129.98	20.00	20.00	1.00	45.95	1590
410	240.00	false	1.50	1.50	55.59	1,000.00	315.58	20.00	20.00	1.00	15.66	400
420	180.00	true	0.78	0.78	81.60	1,000.00	1,200.00	20.00	32.18	1.00	7.36	1590
430	185.00	false	1.83	1.83	79.43	1,000.00	684.91	20.00	20.00	1.00	22.17	440
440	180.00	false	1.04	1.04	81.59	1,000.00	361.15	20.00	20.00	1.00	43.01	1590
450	208.00	false	0.78	0.78	69.48	1,000.00	988.13	20.00	20.00	1.00	21.30	460
460	205.00	false	0.52	0.52	70.78	1,000.00	200.33	20.00	20.00	1.00	46.30	1590
470	208.00	false	0.52	0.52	69.49	1,000.00	903.63	20.00	20.00	1.00	21.30	480
480	205.00	false	0.78	0.78	70.79	1,000.00	266.78	20.00	20.00	1.00	46.09	1590
490	208.00	false	0.26	0.26	69.49	1,000.00	848.28	20.00	20.00	1.00	27.80	500
500	190.00	false	0.52	0.52	77.30	1,000.00	172.37	20.00	20.00	1.00	46.49	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
510	210.00	false	1.04	1.04	68.63	1,000.00	826.79	20.00	20.00	1.00	27.11	560
520	180.00	false	0.78	0.78	81.64	1,000.00	157.59	20.00	20.00	1.00	46.56	1590
530	210.00	false	0.26	0.26	68.64	1,000.00	847.26	20.00	20.00	1.00	17.04	560
540	190.00	false	1.04	1.04	77.31	1,000.00	162.82	20.00	20.00	1.00	46.58	1590
550	210.00	false	0.26	0.26	68.65	1,000.00	851.49	20.00	20.00	1.00	15.66	560
560	220.00	false	0.52	0.52	64.31	1,000.00	166.66	20.00	20.00	1.00	46.58	1590
570	205.00	false	0.26	0.26	70.83	1,000.00	923.24	20.00	20.00	1.00	13.27	600
580	185.00	false	1.31	1.31	79.49	1,000.00	146.88	20.00	20.00	1.00	46.65	1590
590	205.00	false	0.00	0.00	70.83	1,000.00	932.88	20.00	20.00	1.00	11.33	600
600	225.00	false	0.78	0.78	62.15	1,000.00	138.37	20.00	20.00	1.00	46.67	1590
610	200.00	true	0.52	0.52	73.01	1,000.00	1,071.74	20.00	20.00	1.00	10.09	640
620	185.00	false	1.04	1.04	79.51	1,000.00	147.67	20.00	20.00	1.00	46.68	1590
630	200.00	true	0.26	0.26	73.01	1,000.00	1,094.28	20.00	20.00	1.00	6.98	640
640	230.00	false	1.31	1.31	60.00	1,000.00	114.00	20.00	20.00	1.00	46.74	1590
650	210.00	false	1.83	1.83	68.72	1,000.00	667.14	20.00	20.00	1.00	22.17	660
660	205.00	false	2.09	2.09	70.88	1,000.00	596.10	20.00	20.00	1.00	22.17	670
670	200.00	false	0.78	0.78	73.05	1,000.00	241.30	20.00	20.00	1.00	46.64	1590
680	220.00	true	0.52	0.52	64.39	1,000.00	1,200.00	20.00	36.20	1.00	36.20	690
690	220.00	false	0.52	0.52	64.39	1,000.00	201.97	20.00	20.00	1.00	46.78	1590
700	220.00	true	0.52	0.52	64.37	1,000.00	1,140.41	20.00	20.00	1.00	20.00	710
710	220.00	false	0.52	0.52	64.37	1,000.00	163.59	20.00	20.00	1.00	46.80	1590
720	220.00	false	0.52	0.52	64.37	1,000.00	171.41	20.00	20.00	1.00	46.79	1590
730	220.00	false	0.78	0.78	64.36	1,000.00	982.08	20.00	20.00	1.00	20.00	740
740	220.00	false	0.78	0.78	64.36	1,000.00	208.53	20.00	20.00	1.00	46.74	1590
750	220.00	false	0.26	0.26	64.35	1,000.00	956.30	20.00	20.00	1.00	20.00	760
760	220.00	false	1.04	1.04	64.35	1,000.00	160.27	20.00	20.00	1.00	46.78	1590
770	220.00	false	0.52	0.52	64.35	1,000.00	954.67	20.00	20.00	1.00	20.00	780
780	220.00	false	0.52	0.52	64.35	1,000.00	208.35	20.00	20.00	1.00	46.72	1590
790	220.00	false	0.26	0.26	64.34	1,000.00	981.53	20.00	20.00	1.00	20.00	800
800	220.00	false	0.78	0.78	64.34	1,000.00	220.32	20.00	20.00	1.00	46.70	1590
810	220.00	true	0.26	0.26	64.34	1,000.00	1,040.47	20.00	20.00	1.00	20.00	820
820	220.00	false	0.52	0.52	64.34	1,000.00	221.31	20.00	20.00	1.00	46.69	1590
830	210.00	true	2.09	2.09	68.67	1,000.00	1,200.00	20.00	26.61	1.00	28.07	820
840	195.00	false	1.04	1.04	75.16	1,000.00	98.01	20.00	20.00	1.00	46.82	1590
850	190.00	true	2.09	2.09	77.34	1,000.00	1,200.00	20.00	45.06	1.00	37.99	820
860	185.00	false	1.04	1.04	79.51	1,000.00	190.02	20.00	20.00	1.00	46.70	1590
870	227.00	true	3.66	3.66	61.33	1,000.00	1,200.00	20.00	45.71	1.00	44.64	1590
880	200.00	true	1.57	1.57	73.01	1,000.00	1,200.00	20.00	47.77	1.00	44.29	1590
890	200.00	true	1.57	1.57	73.01	1,000.00	1,200.00	20.00	45.01	1.00	44.19	1590
900	200.00	true	1.57	1.57	73.00	1,000.00	1,200.00	20.00	43.06	1.00	44.11	1590
910	170.00	false	0.52	0.52	86.01	1,000.00	85.95	20.00	20.00	1.00	46.82	1590
920	160.00	false	0.78	0.78	90.32	1,000.00	65.89	20.00	20.00	1.00	46.84	1590
930	205.00	true	0.78	0.78	70.80	1,000.00	1,200.00	20.00	21.42	1.00	36.01	970
940	210.00	false	4.18	4.18	68.61	1,000.00	514.32	20.00	20.00	1.00	45.29	1590
950	190.00	true	2.87	2.87	77.28	1,000.00	1,200.00	20.00	58.54	1.00	39.17	1590
960	195.00	true	0.78	0.78	75.12	1,000.00	1,069.63	20.00	20.00	1.00	19.99	970
970	195.00	false	1.04	1.04	75.11	1,000.00	143.47	20.00	20.00	1.00	46.65	1590
980	170.00	true	0.26	0.26	85.94	1,000.00	1,200.00	20.00	27.25	1.00	29.44	1000
1000	170.00	true	1.83	1.83	85.94	1,000.00	1,200.00	20.00	28.43	1.00	29.14	980
1011	180.00	true	4.44	4.44	81.60	1,000.00	1,200.00	20.00	37.62	1.00	39.78	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1020	182.00	true	4.18	4.18	80.73	1,000.00	1,200.00	20.00	57.48	1.00	39.15	1590
1030	155.00	false	1.04	1.04	92.40	1,000.00	937.81	20.00	20.00	1.00	18.17	1050
1040	155.00	false	0.00	0.00	92.40	1,000.00	930.54	20.00	20.00	1.00	17.83	1050
1050	160.00	false	0.00	0.00	90.24	1,000.00	189.64	20.00	20.00	1.00	46.41	1590
1060	155.00	false	0.52	0.52	92.40	1,000.00	860.78	20.00	20.00	1.00	13.50	1110
1070	160.00	false	0.00	0.00	90.23	1,000.00	176.22	20.00	20.00	1.00	15.67	1110
1080	160.00	false	0.00	0.00	90.23	1,000.00	139.67	20.00	20.00	1.00	20.00	1090
1090	160.00	false	0.00	0.00	90.23	1,000.00	122.16	20.00	20.00	1.00	35.36	1080
1100	160.00	false	0.00	0.00	90.23	1,000.00	122.66	20.00	20.00	1.00	15.67	1110
1110	170.00	false	0.00	0.00	85.90	1,000.00	101.35	20.00	20.00	1.00	40.83	1100
1120	160.00	false	0.00	0.00	90.23	1,000.00	97.62	20.00	20.00	1.00	39.80	1110
1130	160.00	false	0.78	0.78	90.23	1,000.00	791.45	20.00	20.00	1.00	20.00	1140
1140	160.00	false	0.26	0.26	90.23	1,000.00	237.69	20.00	20.00	1.00	46.22	1590
1150	160.00	false	1.31	1.31	90.23	1,000.00	814.54	20.00	20.00	1.00	20.00	1160
1160	160.00	false	0.00	0.00	90.23	1,000.00	120.51	20.00	20.00	1.00	46.62	1590
1170	170.00	false	0.00	0.00	85.90	1,000.00	847.46	20.00	20.00	1.00	20.13	1180
1180	170.00	false	0.26	0.26	85.89	1,000.00	797.45	20.00	20.00	1.00	20.88	1200
1190	160.00	false	0.26	0.26	90.23	1,000.00	186.41	20.00	20.00	1.00	46.41	1590
1200	170.00	false	0.26	0.26	85.89	1,000.00	660.03	20.00	20.00	1.00	20.00	1210
1210	170.00	false	0.00	0.00	85.89	1,000.00	250.65	20.00	20.00	1.00	46.17	1590
1220	175.00	false	0.78	0.78	83.72	1,000.00	492.03	20.00	20.00	1.00	20.00	1230
1230	175.00	false	0.52	0.52	83.72	1,000.00	205.74	20.00	20.00	1.00	46.34	1590
1240	175.00	false	0.26	0.26	83.72	1,000.00	476.40	20.00	20.00	1.00	20.00	1250
1250	175.00	false	0.52	0.52	83.72	1,000.00	209.39	20.00	20.00	1.00	46.33	1590
1260	180.00	false	0.78	0.78	81.55	1,000.00	448.73	20.00	20.00	1.00	20.00	1270
1270	180.00	false	0.52	0.52	81.55	1,000.00	196.51	20.00	20.00	1.00	46.37	1590
1280	185.00	false	0.26	0.26	79.38	1,000.00	437.90	20.00	20.00	1.00	20.00	1290
1290	185.00	false	0.26	0.26	79.38	1,000.00	229.10	20.00	20.00	1.00	46.25	1590
1300	183.00	false	0.26	0.26	80.25	1,000.00	473.71	20.00	20.00	1.00	19.13	1320
1310	185.00	false	0.00	0.00	79.38	1,000.00	374.34	20.00	20.00	1.00	20.00	1320
1320	185.00	false	0.78	0.78	79.38	1,000.00	217.17	20.00	20.00	1.00	46.30	1590
1330	185.00	false	0.26	0.26	79.38	1,000.00	227.40	20.00	20.00	1.00	46.26	1590
1340	183.00	false	0.52	0.52	80.25	1,000.00	489.59	20.00	20.00	1.00	20.96	1320
1350	180.00	false	0.52	0.52	81.55	1,000.00	236.47	20.00	20.00	1.00	46.22	1590
1360	180.00	false	2.87	2.87	81.56	1,000.00	893.55	20.00	20.00	1.00	18.45	1320
1370	160.00	false	3.13	3.13	90.23	1,000.00	873.20	20.00	20.00	1.00	38.56	1380
1380	162.00	false	2.35	2.35	89.37	1,000.00	891.85	20.00	20.00	1.00	20.87	1390
1390	160.00	false	0.52	0.52	90.24	1,000.00	310.00	20.00	20.00	1.00	45.92	1590
1400	180.00	true	1.04	1.04	81.57	1,000.00	1,200.00	20.00	27.20	1.00	20.86	1420
1410	180.00	true	0.78	0.78	81.57	1,000.00	1,141.58	20.00	20.00	1.00	13.49	1420
1420	195.00	false	0.52	0.52	75.06	1,000.00	96.29	20.00	20.00	1.00	46.69	1590
1430	185.00	true	2.35	2.35	79.41	1,000.00	1,200.00	20.00	37.93	1.00	34.05	1420
1440	180.00	true	1.83	1.83	81.59	1,000.00	1,200.00	20.00	51.71	1.00	39.07	1590
1450	170.00	false	1.04	1.04	85.93	1,000.00	215.45	20.00	20.00	1.00	46.31	1590
1460	185.00	false	1.04	1.04	79.41	1,000.00	896.50	20.00	20.00	1.00	17.83	1470
1470	190.00	false	0.26	0.26	77.25	1,000.00	134.28	20.00	20.00	1.00	46.52	1590
1480	205.00	false	1.57	1.57	70.74	1,000.00	850.01	20.00	20.00	1.00	36.55	1470
1490	205.00	false	1.31	1.31	70.75	1,000.00	876.15	20.00	20.00	1.00	28.10	1500
1500	200.00	false	1.31	1.31	72.91	1,000.00	850.79	20.00	20.00	1.00	29.00	1510
1510	200.00	false	3.13	3.13	72.92	1,000.00	836.30	20.00	20.00	1.00	30.70	1500

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Pressure (psi)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1520	210.00	false	1.31	1.31	68.58	1,000.00	894.13	20.00	20.00	1.00	21.35	1580
1530	200.00	true	0.78	0.78	72.92	1,000.00	1,167.93	20.00	20.00	1.00	21.65	1520
1540	205.00	false	1.31	1.31	70.75	1,000.00	942.96	20.00	20.00	1.00	20.00	1550
1550	205.00	false	0.26	0.26	70.75	1,000.00	235.01	20.00	20.00	1.00	45.92	1590
1560	210.00	false	1.31	1.31	68.57	1,000.00	302.85	20.00	20.00	1.00	42.82	1580
1570	210.00	false	1.31	1.31	68.57	1,000.00	400.22	20.00	20.00	1.00	20.00	1580
1580	210.00	false	0.52	0.52	68.57	1,000.00	189.38	20.00	20.00	1.00	46.12	1590
1590	260.00	false	0.26	0.26	46.92	1,000.00	142.02	20.00	20.00	1.00	50.16	400
1600	200.00	false	1.57	1.57	72.92	1,000.00	491.75	20.00	20.00	1.00	39.42	1590
1610	190.00	false	0.26	0.26	77.25	1,000.00	210.96	20.00	20.00	1.00	45.84	1590
J-1	0.00	false	0.00	0.00	168.90	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-1
J-2	0.00	false	0.00	0.00	156.47	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-1
J-3	0.00	false	0.00	0.00	168.90	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-2
J-4	0.00	false	0.00	0.00	156.47	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-2
J-5	0.00	false	0.00	0.00	168.90	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-3
J-6	0.00	false	0.00	0.00	156.47	1,000.00	0.00	20.00	100.71	1.00	1.00	PMP-3
J990	160.00	false	0.00	0.00	90.27	1,000.00	221.98	20.00	20.00	1.00	46.38	1590

Base FF
60psi w/ 20psi
System limit

Scenario: WSP Year 2006 (MDD)
Fire Flow Analysis (40psi)
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
10	230.00	true	0.00	0.00	1,000.00	1,200.00	20.00	59.80	20.00	46.63	1590
20	230.00	true	0.26	0.26	1,000.00	1,200.00	20.00	58.40	20.00	45.53	1590
30	225.00	true	0.26	0.26	1,000.00	1,200.00	20.00	59.54	20.00	44.75	1590
40	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	64.45	20.00	43.65	1590
50	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	63.47	20.00	43.06	1590
60	205.00	true	0.52	0.52	1,000.00	1,200.00	20.00	60.70	20.00	40.20	1590
70	205.00	true	0.26	0.26	1,000.00	1,200.00	20.00	58.56	20.00	38.98	1590
80	175.00	true	0.26	0.26	1,000.00	1,200.00	20.00	65.33	20.00	35.42	1590
90	200.00	true	1.04	1.04	1,000.00	1,200.00	20.00	44.55	20.00	28.91	1590
100	205.00	true	4.44	4.44	1,000.00	1,200.00	20.00	38.73	20.00	26.11	1590
110	205.00	true	3.92	3.92	1,000.00	1,148.33	20.00	33.42	20.00	20.00	1590
120	210.00	true	1.57	1.57	1,000.00	1,100.35	20.00	32.59	20.00	20.00	1590
130	208.00	true	1.57	1.57	1,000.00	1,052.33	20.00	35.01	20.00	20.00	400
140	208.00	true	1.04	1.04	1,000.00	1,009.48	20.00	36.60	20.00	20.00	400
* 150	210.00	false	2.09	2.09	1,000.00	970.92	20.00	37.35	20.00	20.00	400
160	220.00	false	1.04	1.04	1,000.00	913.01	20.00	35.82	20.00	20.00	1590
170	205.00	false	0.78	0.78	1,000.00	910.80	20.00	42.55	20.00	20.00	1590
180	190.00	false	0.78	0.78	1,000.00	966.97	20.00	46.52	20.00	20.00	1590
* 190	195.00	false	2.87	2.87	1,000.00	999.80	20.00	43.05	20.00	20.00	1590
200	190.00	true	1.83	1.83	1,000.00	1,043.48	20.00	43.68	20.00	20.00	1590
210	195.00	true	1.57	1.57	1,000.00	1,082.47	20.00	40.31	20.00	20.00	1590
220	180.00	true	0.78	0.78	1,000.00	1,136.73	20.00	45.37	20.00	20.00	1590
230	180.00	true	0.00	0.00	1,000.00	1,200.00	20.00	48.19	20.00	24.25	1590
240	200.00	true	1.83	1.83	1,000.00	1,200.00	20.00	42.85	20.00	27.30	1590
250	200.00	true	3.92	3.92	1,000.00	1,200.00	20.00	48.96	20.00	35.49	1590
260	205.00	true	2.61	2.61	1,000.00	1,200.00	20.00	49.20	20.00	37.55	1590
270	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	55.14	20.00	39.46	1590
280	210.00	true	1.83	1.83	1,000.00	1,200.00	20.00	65.28	20.00	44.79	1590
290	230.00	false	0.26	0.26	1,000.00	237.27	20.00	20.00	20.00	46.83	1590
300	205.00	false	0.26	0.26	1,000.00	231.32	20.00	20.00	20.00	46.44	1590
310	205.00	false	0.52	0.52	1,000.00	281.29	20.00	20.00	20.00	46.14	1590
320	190.00	false	1.57	1.57	1,000.00	588.63	20.00	20.00	20.00	36.15	350
330	180.00	false	1.04	1.04	1,000.00	500.01	20.00	24.34	20.00	20.00	350
340	190.00	false	1.57	1.57	1,000.00	612.07	20.00	20.00	20.00	31.00	350
350	190.00	false	0.26	0.26	1,000.00	214.03	20.00	20.00	20.00	45.55	1590
360	205.00	false	0.52	0.52	1,000.00	142.47	20.00	20.00	20.00	45.98	1590
370	215.00	false	1.04	1.04	1,000.00	114.76	20.00	20.00	20.00	46.19	1590
380	235.00	false	1.83	1.83	1,000.00	94.86	20.00	20.00	20.00	46.34	1590
390	240.00	false	0.26	0.26	1,000.00	113.84	20.00	20.00	20.00	45.55	400
400	250.00	false	0.78	0.78	1,000.00	129.98	20.00	20.00	20.00	45.95	1590
410	240.00	false	1.50	1.50	1,000.00	293.81	20.00	24.34	20.00	20.00	400
420	180.00	false	0.78	0.78	1,000.00	966.97	20.00	48.07	20.00	20.00	1590
430	185.00	false	1.83	1.83	1,000.00	685.02	20.00	20.00	20.00	22.17	440
440	180.00	false	1.04	1.04	1,000.00	361.17	20.00	20.00	20.00	43.01	1590
450	208.00	false	0.78	0.78	1,000.00	988.46	20.00	20.00	20.00	21.30	460
460	205.00	false	0.52	0.52	1,000.00	200.33	20.00	20.00	20.00	46.31	1590
470	208.00	false	0.52	0.52	1,000.00	903.84	20.00	20.00	20.00	21.30	480
480	205.00	false	0.78	0.78	1,000.00	266.79	20.00	20.00	20.00	46.09	1590
490	208.00	false	0.26	0.26	1,000.00	848.41	20.00	20.00	20.00	27.80	500
500	190.00	false	0.52	0.52	1,000.00	172.37	20.00	20.00	20.00	46.49	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
510	210.00	false	1.04	1.04	1,000.00	826.89	20.00	20.00	20.00	27.11	560
520	180.00	false	0.78	0.78	1,000.00	157.59	20.00	20.00	20.00	46.57	1590
530	210.00	false	0.26	0.26	1,000.00	817.83	20.00	23.04	20.00	20.00	560
540	190.00	false	1.04	1.04	1,000.00	162.82	20.00	20.00	20.00	46.58	1590
550	210.00	false	0.26	0.26	1,000.00	809.06	20.00	24.34	20.00	20.00	560
560	220.00	false	0.52	0.52	1,000.00	166.66	20.00	20.00	20.00	46.58	1590
570	205.00	false	0.26	0.26	1,000.00	851.25	20.00	27.00	20.00	20.00	600
580	185.00	false	1.31	1.31	1,000.00	146.88	20.00	20.00	20.00	46.65	1590
590	205.00	false	0.00	0.00	1,000.00	842.00	20.00	28.67	20.00	20.00	600
600	225.00	false	0.78	0.78	1,000.00	138.37	20.00	20.00	20.00	46.67	1590
610	200.00	false	0.52	0.52	1,000.00	949.34	20.00	30.53	20.00	20.00	640
620	185.00	false	1.04	1.04	1,000.00	147.67	20.00	20.00	20.00	46.68	1590
630	200.00	false	0.26	0.26	1,000.00	937.87	20.00	33.02	20.00	20.00	640
640	230.00	false	1.31	1.31	1,000.00	114.00	20.00	20.00	20.00	46.75	1590
650	210.00	false	1.83	1.83	1,000.00	667.15	20.00	20.00	20.00	22.17	660
660	205.00	false	2.09	2.09	1,000.00	596.10	20.00	20.00	20.00	22.17	670
670	200.00	false	0.78	0.78	1,000.00	241.30	20.00	20.00	20.00	46.64	1590
680	220.00	true	0.52	0.52	1,000.00	1,200.00	20.00	36.21	20.00	36.21	690
690	220.00	false	0.52	0.52	1,000.00	201.97	20.00	20.00	20.00	46.78	1590
700	220.00	true	0.52	0.52	1,000.00	1,140.75	20.00	20.00	20.00	20.00	710
710	220.00	false	0.52	0.52	1,000.00	163.59	20.00	20.00	20.00	46.80	1590
720	220.00	false	0.52	0.52	1,000.00	171.42	20.00	20.00	20.00	46.79	1590
730	220.00	false	0.78	0.78	1,000.00	982.61	20.00	20.00	20.00	20.00	740
740	220.00	false	0.78	0.78	1,000.00	208.54	20.00	20.00	20.00	46.74	1590
750	220.00	false	0.26	0.26	1,000.00	956.94	20.00	20.00	20.00	20.00	760
760	220.00	false	1.04	1.04	1,000.00	160.27	20.00	20.00	20.00	46.78	1590
770	220.00	false	0.52	0.52	1,000.00	955.57	20.00	20.00	20.00	20.00	780
780	220.00	false	0.52	0.52	1,000.00	208.37	20.00	20.00	20.00	46.72	1590
790	220.00	false	0.26	0.26	1,000.00	982.80	20.00	20.00	20.00	20.00	800
800	220.00	false	0.78	0.78	1,000.00	220.34	20.00	20.00	20.00	46.70	1590
810	220.00	true	0.26	0.26	1,000.00	1,042.41	20.00	20.00	20.00	20.00	820
820	220.00	false	0.52	0.52	1,000.00	221.33	20.00	20.00	20.00	46.68	1590
830	210.00	true	2.09	2.09	1,000.00	1,200.00	20.00	26.89	20.00	28.31	820
840	195.00	false	1.04	1.04	1,000.00	98.02	20.00	20.00	20.00	46.81	1590
850	190.00	true	2.09	2.09	1,000.00	1,200.00	20.00	45.40	20.00	38.27	820
860	185.00	false	1.04	1.04	1,000.00	190.04	20.00	20.00	20.00	46.70	1590
870	227.00	true	3.66	3.66	1,000.00	1,200.00	20.00	45.81	20.00	44.62	1590
880	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	48.17	20.00	44.25	1590
890	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	47.87	20.00	44.24	1590
900	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	45.84	20.00	44.15	1590
910	170.00	false	0.52	0.52	1,000.00	85.97	20.00	20.00	20.00	46.82	1590
920	160.00	false	0.78	0.78	1,000.00	65.90	20.00	20.00	20.00	46.84	1590
930	205.00	true	0.78	0.78	1,000.00	1,200.00	20.00	24.11	20.00	39.40	970
940	210.00	false	4.18	4.18	1,000.00	514.75	20.00	20.00	20.00	45.29	1590
950	190.00	true	2.87	2.87	1,000.00	1,200.00	20.00	58.75	20.00	39.24	1590
960	195.00	true	0.78	0.78	1,000.00	1,118.31	20.00	20.01	20.00	20.00	970
970	195.00	false	1.04	1.04	1,000.00	143.62	20.00	20.00	20.00	46.64	1590
980	170.00	true	0.26	0.26	1,000.00	1,200.00	20.00	43.12	20.00	40.29	1590
1000	170.00	true	1.83	1.83	1,000.00	1,200.00	20.00	44.90	20.00	40.21	1590
1011	180.00	true	4.44	4.44	1,000.00	1,200.00	20.00	42.68	20.00	40.07	1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1020	182.00	true	4.18	4.18	1,000.00	1,200.00	20.00	57.82	20.00	39.24	1590
1030	155.00	false	1.04	1.04	1,000.00	926.70	20.00	21.84	20.00	20.00	1050
1040	155.00	false	0.00	0.00	1,000.00	917.07	20.00	22.17	20.00	20.00	1050
1050	160.00	false	0.00	0.00	1,000.00	189.67	20.00	20.00	20.00	46.40	1590
1060	155.00	false	0.52	0.52	1,000.00	818.32	20.00	26.50	20.00	20.00	1110
1070	160.00	false	0.00	0.00	1,000.00	170.24	20.00	24.34	20.00	20.00	1110
1080	160.00	false	0.00	0.00	1,000.00	139.68	20.00	20.00	20.00	20.00	1090
1090	160.00	false	0.00	0.00	1,000.00	122.16	20.00	20.00	20.00	35.37	1080
1100	160.00	false	0.00	0.00	1,000.00	118.50	20.00	24.34	20.00	20.00	1110
1110	170.00	false	0.00	0.00	1,000.00	101.35	20.00	20.00	20.00	40.83	1100
1120	160.00	false	0.00	0.00	1,000.00	97.62	20.00	20.00	20.00	39.80	1110
1130	160.00	false	0.78	0.78	1,000.00	792.06	20.00	20.00	20.00	20.00	1140
1140	160.00	false	0.26	0.26	1,000.00	237.71	20.00	20.00	20.00	46.22	1590
1150	160.00	false	1.31	1.31	1,000.00	814.99	20.00	20.00	20.00	20.00	1160
1160	160.00	false	0.00	0.00	1,000.00	120.51	20.00	20.00	20.00	46.62	1590
1170	170.00	false	0.00	0.00	1,000.00	847.87	20.00	20.00	20.00	20.13	1180
1180	170.00	false	0.26	0.26	1,000.00	797.79	20.00	20.00	20.00	20.88	1200
1190	160.00	false	0.26	0.26	1,000.00	186.42	20.00	20.00	20.00	46.41	1590
1200	170.00	false	0.26	0.26	1,000.00	660.24	20.00	20.00	20.00	20.00	1210
1210	170.00	false	0.00	0.00	1,000.00	250.67	20.00	20.00	20.00	46.17	1590
1220	175.00	false	0.78	0.78	1,000.00	492.12	20.00	20.00	20.00	20.00	1230
1230	175.00	false	0.52	0.52	1,000.00	205.75	20.00	20.00	20.00	46.34	1590
1240	175.00	false	0.26	0.26	1,000.00	476.48	20.00	20.00	20.00	20.00	1250
1250	175.00	false	0.52	0.52	1,000.00	209.40	20.00	20.00	20.00	46.33	1590
1260	180.00	false	0.78	0.78	1,000.00	448.80	20.00	20.00	20.00	20.00	1270
1270	180.00	false	0.52	0.52	1,000.00	196.52	20.00	20.00	20.00	46.37	1590
1280	185.00	false	0.26	0.26	1,000.00	437.97	20.00	20.00	20.00	20.00	1290
1290	185.00	false	0.26	0.26	1,000.00	229.11	20.00	20.00	20.00	46.25	1590
1300	183.00	false	0.26	0.26	1,000.00	470.01	20.00	20.87	20.00	20.00	1320
1310	185.00	false	0.00	0.00	1,000.00	374.38	20.00	20.00	20.00	20.00	1320
1320	185.00	false	0.78	0.78	1,000.00	217.18	20.00	20.00	20.00	46.30	1590
1330	185.00	false	0.26	0.26	1,000.00	227.41	20.00	20.00	20.00	46.26	1590
1340	183.00	false	0.52	0.52	1,000.00	489.69	20.00	20.00	20.00	20.96	1320
1350	180.00	false	0.52	0.52	1,000.00	236.48	20.00	20.00	20.00	46.22	1590
1360	180.00	false	2.87	2.87	1,000.00	881.25	20.00	21.57	20.00	20.00	1320
1370	160.00	false	3.13	3.13	1,000.00	873.97	20.00	20.00	20.00	38.55	1380
1380	162.00	false	2.35	2.35	1,000.00	892.32	20.00	20.00	20.00	20.87	1390
1390	160.00	false	0.52	0.52	1,000.00	310.03	20.00	20.00	20.00	45.92	1590
1400	180.00	true	1.04	1.04	1,000.00	1,200.00	20.00	27.29	20.00	20.95	1420
1410	180.00	true	0.78	0.78	1,000.00	1,073.44	20.00	26.51	20.00	20.00	1420
1420	195.00	false	0.52	0.52	1,000.00	96.29	20.00	20.00	20.00	46.69	1590
1430	185.00	true	2.35	2.35	1,000.00	1,200.00	20.00	38.02	20.00	34.14	1420
1440	180.00	true	1.83	1.83	1,000.00	1,200.00	20.00	51.89	20.00	39.13	1590
1450	170.00	false	1.04	1.04	1,000.00	215.47	20.00	20.00	20.00	46.31	1590
1460	185.00	false	1.04	1.04	1,000.00	878.80	20.00	22.17	20.00	20.00	1470
1470	190.00	false	0.26	0.26	1,000.00	134.28	20.00	20.00	20.00	46.52	1590
1480	205.00	false	1.57	1.57	1,000.00	850.52	20.00	20.00	20.00	36.56	1470
1490	205.00	false	1.31	1.31	1,000.00	876.99	20.00	20.00	20.00	28.12	1500
1500	200.00	false	1.31	1.31	1,000.00	851.64	20.00	20.00	20.00	29.02	1510
1510	200.00	false	3.13	3.13	1,000.00	837.23	20.00	20.00	20.00	30.71	1500

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
1520	210.00	false	1.31	1.31	1,000.00	894.73	20.00	20.00	20.00	21.35	1580
1530	200.00	true	0.78	0.78	1,000.00	1,169.02	20.00	20.00	20.00	21.66	1520
1540	205.00	false	1.31	1.31	1,000.00	943.72	20.00	20.00	20.00	20.00	1550
1550	205.00	false	0.26	0.26	1,000.00	235.04	20.00	20.00	20.00	45.92	1590
1560	210.00	false	1.31	1.31	1,000.00	302.88	20.00	20.00	20.00	42.82	1580
1570	210.00	false	1.31	1.31	1,000.00	400.29	20.00	20.00	20.00	20.00	1580
1580	210.00	false	0.52	0.52	1,000.00	189.39	20.00	20.00	20.00	46.12	1590
1590	260.00	false	0.26	0.26	1,000.00	142.03	20.00	20.00	20.00	50.16	400
1600	200.00	false	1.57	1.57	1,000.00	491.79	20.00	20.00	20.00	39.42	1590
1610	190.00	false	0.26	0.26	1,000.00	210.97	20.00	20.00	20.00	45.84	1590
J-1	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-6
J-2	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	J-6
J-3	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-6
J-4	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	J-6
J-5	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-6
J-6	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-3
J990	160.00	false	0.00	0.00	1,000.00	223.19	20.00	20.00	20.00	46.35	1590

Scenario: WSP Year 2006 (MDD)
Fire Flow Analysis
Fire Flow Report

Increase Hgl to 348.6

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-6
J-2	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	J-4
J-3	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-2
J-4	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	J-6
J-5	234.00	false	0.00	0.00	1,000.00	0.00	20.00	21.27	20.00	20.00	J-6
J-6	234.00	false	0.00	0.00	1,000.00	0.00	20.00	20.00	20.00	20.00	PMP-3
J-10	230.00	true	0.00	0.00	1,000.00	1,200.00	20.00	59.80	20.00	46.63	J-1590
J-20	230.00	true	0.26	0.26	1,000.00	1,200.00	20.00	58.40	20.00	45.53	J-1590
J-30	225.00	true	0.26	0.26	1,000.00	1,200.00	20.00	59.54	20.00	44.75	J-1590
J-40	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	64.45	20.00	43.65	J-1590
J-50	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	63.47	20.00	43.06	J-1590
J-60	205.00	true	0.52	0.52	1,000.00	1,200.00	20.00	60.70	20.00	40.20	J-1590
J-70	205.00	true	0.26	0.26	1,000.00	1,200.00	20.00	58.56	20.00	38.98	J-1590
J-80	175.00	true	0.26	0.26	1,000.00	1,200.00	20.00	65.33	20.00	35.42	J-1590
J-90	200.00	true	1.04	1.04	1,000.00	1,200.00	20.00	44.55	20.00	28.91	J-1590
J-100	205.00	true	4.44	4.44	1,000.00	1,200.00	20.00	38.73	20.00	26.11	J-1590
J-105	0.00	true	0.00	0.00	1,000.00	1,200.00	20.00	121.70	1.00	21.99	J-1590
J-110	205.00	true	3.92	3.92	1,000.00	1,148.33	20.00	33.42	20.00	20.00	J-1590
J-120	210.00	true	1.57	1.57	1,000.00	1,100.35	20.00	32.59	20.00	20.00	J-1590
J-130	208.00	true	1.57	1.57	1,000.00	1,052.33	20.00	35.01	20.00	20.00	J-400
J-140	208.00	true	1.04	1.04	1,000.00	1,009.48	20.00	36.60	20.00	20.00	J-400
J-150	210.00	false	2.09	2.09	1,000.00	970.92	20.00	37.35	20.00	20.00	J-400
J-160	220.00	false	1.04	1.04	1,000.00	913.01	20.00	35.82	20.00	20.00	J-1590
J-170	205.00	false	0.78	0.78	1,000.00	910.80	20.00	42.55	20.00	20.00	J-1590
J-180	190.00	false	0.78	0.78	1,000.00	966.97	20.00	46.52	20.00	20.00	J-1590
J-190	195.00	false	2.87	2.87	1,000.00	999.80	20.00	43.05	20.00	20.00	J-1590
J-200	190.00	true	1.83	1.83	1,000.00	1,043.48	20.00	43.68	20.00	20.00	J-1590
J-210	195.00	true	1.57	1.57	1,000.00	1,082.47	20.00	40.31	20.00	20.00	J-1590
J-220	180.00	true	0.78	0.78	1,000.00	1,136.73	20.00	45.37	20.00	20.00	J-1590
J-230	180.00	true	0.00	0.00	1,000.00	1,200.00	20.00	48.19	20.00	24.25	J-1590
J-240	200.00	true	1.83	1.83	1,000.00	1,200.00	20.00	42.85	20.00	27.30	J-1590
J-245	0.00	true	0.00	0.00	1,000.00	1,200.00	20.00	130.65	1.00	31.75	J-1590
J-250	200.00	true	3.92	3.92	1,000.00	1,200.00	20.00	48.96	20.00	35.49	J-1590
J-260	205.00	true	2.61	2.61	1,000.00	1,200.00	20.00	49.20	20.00	37.55	J-1590
J-270	210.00	true	0.78	0.78	1,000.00	1,200.00	20.00	55.14	20.00	39.46	J-1590
J-280	210.00	true	1.83	1.83	1,000.00	1,200.00	20.00	65.28	20.00	44.79	J-1590
J-290	230.00	false	0.26	0.26	1,000.00	237.27	20.00	20.00	20.00	46.83	J-1590
J-300	205.00	false	0.26	0.26	1,000.00	231.32	20.00	20.00	20.00	46.44	J-1590
J-310	205.00	false	0.52	0.52	1,000.00	281.29	20.00	20.00	20.00	46.14	J-1590
J-320	190.00	false	1.57	1.57	1,000.00	588.63	20.00	20.00	20.00	36.15	J-350
J-330	180.00	false	1.04	1.04	1,000.00	500.01	20.00	24.34	20.00	20.00	J-350
J-340	190.00	false	1.57	1.57	1,000.00	612.07	20.00	20.00	20.00	31.00	J-350
J-350	190.00	false	0.26	0.26	1,000.00	214.03	20.00	20.00	20.00	45.55	J-1590
J-360	205.00	false	0.52	0.52	1,000.00	142.47	20.00	20.00	20.00	45.98	J-1590
J-370	215.00	false	1.04	1.04	1,000.00	114.76	20.00	20.00	20.00	46.19	J-1590
J-380	235.00	false	1.83	1.83	1,000.00	94.86	20.00	20.00	20.00	46.34	J-1590
J-390	240.00	false	0.26	0.26	1,000.00	113.84	20.00	20.00	20.00	45.55	J-400
J-400	250.00	false	0.78	0.78	1,000.00	129.98	20.00	20.00	20.00	45.95	J-1590
J-410	240.00	false	1.50	1.50	1,000.00	293.81	20.00	24.34	20.00	20.00	J-400
J-420	180.00	false	0.78	0.78	1,000.00	966.97	20.00	48.07	20.00	20.00	J-1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-430	185.00	false	1.83	1.83	1,000.00	685.02	20.00	20.00	20.00	22.17	J-440
J-440	180.00	false	1.04	1.04	1,000.00	361.17	20.00	20.00	20.00	43.01	J-1590
J-450	208.00	false	0.78	0.78	1,000.00	988.46	20.00	20.00	20.00	21.30	J-460
J-460	205.00	false	0.52	0.52	1,000.00	200.33	20.00	20.00	20.00	46.31	J-1590
J-470	208.00	false	0.52	0.52	1,000.00	903.84	20.00	20.00	20.00	21.30	J-480
J-480	205.00	false	0.78	0.78	1,000.00	266.79	20.00	20.00	20.00	46.09	J-1590
J-490	208.00	false	0.26	0.26	1,000.00	848.41	20.00	20.00	20.00	27.80	J-500
J-500	190.00	false	0.52	0.52	1,000.00	172.37	20.00	20.00	20.00	46.49	J-1590
J-510	210.00	false	1.04	1.04	1,000.00	826.89	20.00	20.00	20.00	27.11	J-560
J-520	180.00	false	0.78	0.78	1,000.00	157.59	20.00	20.00	20.00	46.57	J-1590
J-530	210.00	false	0.26	0.26	1,000.00	817.83	20.00	23.04	20.00	20.00	J-560
J-540	190.00	false	1.04	1.04	1,000.00	162.82	20.00	20.00	20.00	46.58	J-1590
J-550	210.00	false	0.26	0.26	1,000.00	809.06	20.00	24.34	20.00	20.00	J-560
J-560	220.00	false	0.52	0.52	1,000.00	166.66	20.00	20.00	20.00	46.58	J-1590
J-570	205.00	false	0.26	0.26	1,000.00	851.25	20.00	27.00	20.00	20.00	j-600
J-580	185.00	false	1.31	1.31	1,000.00	146.88	20.00	20.00	20.00	46.65	J-1590
J-590	205.00	false	0.00	0.00	1,000.00	842.00	20.00	28.67	20.00	20.00	j-600
j-600	225.00	false	0.78	0.78	1,000.00	138.37	20.00	20.00	20.00	46.67	J-1590
J-610	200.00	false	0.52	0.52	1,000.00	949.34	20.00	30.53	20.00	20.00	J-640
J-620	185.00	false	1.04	1.04	1,000.00	147.67	20.00	20.00	20.00	46.68	J-1590
J-630	200.00	false	0.26	0.26	1,000.00	937.87	20.00	33.02	20.00	20.00	J-640
J-640	230.00	false	1.31	1.31	1,000.00	114.00	20.00	20.00	20.00	46.75	J-1590
J-650	210.00	false	1.83	1.83	1,000.00	667.15	20.00	20.00	20.00	22.17	J-660
J-660	205.00	false	2.09	2.09	1,000.00	596.10	20.00	20.00	20.00	22.17	J-670
J-670	200.00	false	0.78	0.78	1,000.00	241.30	20.00	20.00	20.00	46.64	J-1590
J-680	220.00	true	0.52	0.52	1,000.00	1,200.00	20.00	36.21	20.00	36.21	J-690
J-690	220.00	false	0.52	0.52	1,000.00	201.97	20.00	20.00	20.00	46.78	J-1590
J-700	220.00	true	0.52	0.52	1,000.00	1,140.75	20.00	20.00	20.00	20.00	J-710
J-710	220.00	false	0.52	0.52	1,000.00	163.59	20.00	20.00	20.00	46.80	J-1590
J-720	220.00	false	0.52	0.52	1,000.00	171.42	20.00	20.00	20.00	46.79	J-1590
J-730	220.00	false	0.78	0.78	1,000.00	982.61	20.00	20.00	20.00	20.00	J-740
J-740	220.00	false	0.78	0.78	1,000.00	208.54	20.00	20.00	20.00	46.74	J-1590
J-750	220.00	false	0.26	0.26	1,000.00	956.94	20.00	20.00	20.00	20.00	J-760
J-760	220.00	false	1.04	1.04	1,000.00	160.27	20.00	20.00	20.00	46.78	J-1590
J-770	220.00	false	0.52	0.52	1,000.00	955.57	20.00	20.00	20.00	20.00	J-780
J-780	220.00	false	0.52	0.52	1,000.00	208.37	20.00	20.00	20.00	46.72	J-1590
J-790	220.00	false	0.26	0.26	1,000.00	982.80	20.00	20.00	20.00	20.00	J-800
J-800	220.00	false	0.78	0.78	1,000.00	220.34	20.00	20.00	20.00	46.70	J-1590
J-810	220.00	true	0.26	0.26	1,000.00	1,042.41	20.00	20.00	20.00	20.00	J-820
J-820	220.00	false	0.52	0.52	1,000.00	221.33	20.00	20.00	20.00	46.68	J-1590
J-830	210.00	true	2.09	2.09	1,000.00	1,200.00	20.00	26.89	20.00	28.31	J-820
J-840	195.00	false	1.04	1.04	1,000.00	98.02	20.00	20.00	20.00	46.81	J-1590
J-850	190.00	true	2.09	2.09	1,000.00	1,200.00	20.00	45.40	20.00	38.27	J-820
J-860	185.00	false	1.04	1.04	1,000.00	190.04	20.00	20.00	20.00	46.70	J-1590
J-870	227.00	true	3.66	3.66	1,000.00	1,200.00	20.00	45.81	20.00	44.62	J-1590
J-880	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	48.17	20.00	44.25	J-1590
J-890	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	47.87	20.00	44.24	J-1590
J-900	200.00	true	1.57	1.57	1,000.00	1,200.00	20.00	45.84	20.00	44.15	J-1590
J-910	170.00	false	0.52	0.52	1,000.00	85.97	20.00	20.00	20.00	46.82	J-1590
J-920	160.00	false	0.78	0.78	1,000.00	65.90	20.00	20.00	20.00	46.84	J-1590

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-930	205.00	true	0.78	0.78	1,000.00	1,200.00	20.00	24.11	20.00	39.40	J-970
J-940	210.00	false	4.18	4.18	1,000.00	514.74	20.00	20.00	20.00	45.29	J-1590
J-945	0.00	false	0.00	0.00	1,000.00	782.94	20.00	20.00	1.00	8.33	J-940
J-950	190.00	true	2.87	2.87	1,000.00	1,200.00	20.00	58.75	20.00	39.24	J-1590
J-960	195.00	true	0.78	0.78	1,000.00	1,118.31	20.00	20.01	20.00	20.00	J-970
J-970	195.00	false	1.04	1.04	1,000.00	143.62	20.00	20.00	20.00	46.64	J-1590
J-980	170.00	true	0.26	0.26	1,000.00	1,200.00	20.00	43.12	20.00	40.29	J-1590
J-990	160.00	false	0.00	0.00	1,000.00	223.19	20.00	20.00	20.00	46.35	J-1590
J-1000	170.00	true	1.83	1.83	1,000.00	1,200.00	20.00	44.90	20.00	40.21	J-1590
J-1011	180.00	true	4.44	4.44	1,000.00	1,200.00	20.00	42.68	20.00	40.07	J-1590
J-1015	0.00	true	0.00	0.00	1,000.00	1,200.00	20.00	125.65	1.00	39.68	J-1590
J-1020	182.00	true	4.18	4.18	1,000.00	1,200.00	20.00	57.82	20.00	39.24	J-1590
J-1030	155.00	false	1.04	1.04	1,000.00	926.70	20.00	21.84	20.00	20.00	J-1050
J-1040	155.00	false	0.00	0.00	1,000.00	917.07	20.00	22.17	20.00	20.00	J-1050
J-1050	160.00	false	0.00	0.00	1,000.00	189.67	20.00	20.00	20.00	46.40	J-1590
J-1060	155.00	false	0.52	0.52	1,000.00	818.32	20.00	26.50	20.00	20.00	J-1110
J-1070	160.00	false	0.00	0.00	1,000.00	170.24	20.00	24.34	20.00	20.00	J-1110
J-1080	160.00	false	0.00	0.00	1,000.00	139.68	20.00	20.00	20.00	20.00	J-1090
J-1090	160.00	false	0.00	0.00	1,000.00	122.16	20.00	20.00	20.00	35.37	J-1080
J-1100	160.00	false	0.00	0.00	1,000.00	118.50	20.00	24.34	20.00	20.00	J-1110
J-1110	170.00	false	0.00	0.00	1,000.00	101.35	20.00	20.00	20.00	40.83	J-1100
J-1120	160.00	false	0.00	0.00	1,000.00	97.62	20.00	20.00	20.00	39.80	J-1110
J-1130	160.00	false	0.78	0.78	1,000.00	792.06	20.00	20.00	20.00	20.00	J-1140
J-1140	160.00	false	0.26	0.26	1,000.00	237.71	20.00	20.00	20.00	46.22	J-1590
J-1150	160.00	false	1.31	1.31	1,000.00	814.99	20.00	20.00	20.00	20.00	J-1160
J-1160	160.00	false	0.00	0.00	1,000.00	120.51	20.00	20.00	20.00	46.62	J-1590
J-1170	170.00	false	0.00	0.00	1,000.00	847.87	20.00	20.00	20.00	20.13	J-1180
J-1180	170.00	false	0.26	0.26	1,000.00	797.79	20.00	20.00	20.00	20.88	J-1200
J-1190	160.00	false	0.26	0.26	1,000.00	186.42	20.00	20.00	20.00	46.41	J-1590
J-1200	170.00	false	0.26	0.26	1,000.00	660.24	20.00	20.00	20.00	20.00	J-1210
J-1210	170.00	false	0.00	0.00	1,000.00	250.67	20.00	20.00	20.00	46.17	J-1590
J-1220	175.00	false	0.78	0.78	1,000.00	492.12	20.00	20.00	20.00	20.00	J-1230
J-1230	175.00	false	0.52	0.52	1,000.00	205.75	20.00	20.00	20.00	46.34	J-1590
J-1240	175.00	false	0.26	0.26	1,000.00	476.48	20.00	20.00	20.00	20.00	J-1250
J-1250	175.00	false	0.52	0.52	1,000.00	209.40	20.00	20.00	20.00	46.33	J-1590
J-1260	180.00	false	0.78	0.78	1,000.00	448.80	20.00	20.00	20.00	20.00	J-1270
J-1270	180.00	false	0.52	0.52	1,000.00	196.52	20.00	20.00	20.00	46.37	J-1590
J-1280	185.00	false	0.26	0.26	1,000.00	437.97	20.00	20.00	20.00	20.00	J-1290
J-1290	185.00	false	0.26	0.26	1,000.00	229.11	20.00	20.00	20.00	46.25	J-1590
J-1300	183.00	false	0.26	0.26	1,000.00	470.01	20.00	20.87	20.00	20.00	J-1320
J-1310	185.00	false	0.00	0.00	1,000.00	374.38	20.00	20.00	20.00	20.00	J-1320
J-1320	185.00	false	0.78	0.78	1,000.00	217.18	20.00	20.00	20.00	46.30	J-1590
J-1330	185.00	false	0.26	0.26	1,000.00	227.41	20.00	20.00	20.00	46.26	J-1590
J-1340	183.00	false	0.52	0.52	1,000.00	489.69	20.00	20.00	20.00	20.96	J-1320
J-1350	180.00	false	0.52	0.52	1,000.00	236.48	20.00	20.00	20.00	46.22	J-1590
J-1360	180.00	false	2.87	2.87	1,000.00	881.25	20.00	21.57	20.00	20.00	J-1320
J-1370	160.00	false	3.13	3.13	1,000.00	873.97	20.00	20.00	20.00	38.55	J-1380
J-1380	162.00	false	2.35	2.35	1,000.00	892.32	20.00	20.00	20.00	20.87	J-1390
J-1390	160.00	false	0.52	0.52	1,000.00	310.03	20.00	20.00	20.00	45.92	J-1590
J-1400	180.00	true	1.04	1.04	1,000.00	1,200.00	20.00	27.29	20.00	20.95	J-1420

Scenario: WSP Year 2006
Fire Flow Analysis
Fire Flow Report

Label	Elevation (ft)	Satisfies Fire Flow Constraints?	Base Flow (gpm)	Demand (Calculated) (gpm)	Needed Fire Flow (gpm)	Available Fire Flow (gpm)	Residual Pressure (psi)	Calculated Residual Pressure (psi)	Minimum System Pressure (psi)	Calculated Minimum System Pressure (psi)	Minimum System Junction
J-1410	180.00	true	0.78	0.78	1,000.00	1,073.44	20.00	26.51	20.00	20.00	J-1420
J-1420	195.00	false	0.52	0.52	1,000.00	96.29	20.00	20.00	20.00	46.69	J-1590
J-1430	185.00	true	2.35	2.35	1,000.00	1,200.00	20.00	38.02	20.00	34.14	J-1420
J-1440	180.00	true	1.83	1.83	1,000.00	1,200.00	20.00	51.89	20.00	39.13	J-1590
J-1450	170.00	false	1.04	1.04	1,000.00	215.47	20.00	20.00	20.00	46.31	J-1590
J-1460	185.00	false	1.04	1.04	1,000.00	878.80	20.00	22.17	20.00	20.00	J-1470
J-1470	190.00	false	0.26	0.26	1,000.00	134.28	20.00	20.00	20.00	46.52	J-1590
J-1480	205.00	false	1.57	1.57	1,000.00	850.52	20.00	20.00	20.00	36.56	J-1470
J-1490	205.00	false	1.31	1.31	1,000.00	876.99	20.00	20.00	20.00	28.12	J-1500
J-1500	200.00	false	1.31	1.31	1,000.00	851.64	20.00	20.00	20.00	29.02	J-1510
J-1510	200.00	false	3.13	3.13	1,000.00	837.23	20.00	20.00	20.00	30.71	J-1500
J-1520	210.00	false	1.31	1.31	1,000.00	894.73	20.00	20.00	20.00	21.35	J-1580
J-1530	200.00	true	0.78	0.78	1,000.00	1,169.02	20.00	20.00	20.00	21.66	J-1520
J-1540	205.00	false	1.31	1.31	1,000.00	943.72	20.00	20.00	20.00	20.00	J-1550
J-1550	205.00	false	0.26	0.26	1,000.00	235.04	20.00	20.00	20.00	45.92	J-1590
J-1560	210.00	false	1.31	1.31	1,000.00	302.88	20.00	20.00	20.00	42.82	J-1580
J-1570	210.00	false	1.31	1.31	1,000.00	400.29	20.00	20.00	20.00	20.00	J-1580
J-1580	210.00	false	0.52	0.52	1,000.00	189.39	20.00	20.00	20.00	46.12	J-1590
J-1590	260.00	false	0.26	0.26	1,000.00	142.03	20.00	20.00	20.00	50.16	J-400
J-1600	200.00	false	1.57	1.57	1,000.00	491.79	20.00	20.00	20.00	39.42	J-1590
J-1610	190.00	false	0.26	0.26	1,000.00	210.97	20.00	20.00	20.00	45.84	J-1590

NOTICE OF GROUND WATER RIGHT APPLICATION No. G2-20035

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
OLYMPIA

TAKE NOTICE:

That ARTHUR R. ANDERSON, FOR TIMBER LAKES, INC. of [illegible], Washington on March 16, 1972 filed application for permit to withdraw public ground waters [illegible] through a well situated within Lot 85 of the [illegible]t. of Timberlake No. 6 of Sec. [illegible] 18, Township 20 N., Range 2 W., W.M., in Mason County, in the amount of 350 gallons per minute, subject to existing rights continuously, each year for the purpose of community domestic supply.

Protests or objections to approval of this application must include a detailed statement of the basis for objections; protests must be accompanied by a two dollars ($2.00) recording fee and filed with the Department of Ecology within thirty (30) days from June 1, 1972.

Witness my hand and official seal this 12th day of May, 1972.

R. JERRY BOLLEN,
Assistant Director,
Department of Ecology

5/25-6/1-21

[illegible]of Publication

[illegible]s.

.... being first duly sworn

[illegible] is the .... bookkeeper ...

[illegible]NTY JOURNAL, a weekly newspaper. [illegible]vspaper and it is now and has been for [illegible]he date of the publication hereinafter [illegible]ish language continuously as a weekly [illegible]County, Washington, and it is now and [illegible] in an office maintained at the aforesaid [illegible]aper. That the said SHELTON-MASON [illegible]th day of August, 1941, approved as a [illegible]ourt of said Mason County.

[illegible] the annexed is a true copy of a........ ...

......Ground Water Right Application No. G2-20035

....

as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of .... two consecutive weeks, commencing on the

.....25.....day of ....May.........., 19..72.., and ending on the

.....1.....day of ....June.........., 19..72.., both dates inclusive, and that such newspaper was regularly distributed to its subscribers during all of said period. That the full amount of the fee charged for the foregoing publication is the sum of $..9.63......

.... [signature] ....

Subscribed and sworn to before me this ....1........day of

...................June......, 19..72..

.... [signature] ....
Notary Public in and for the State of Washington
Residing at Shelton, Washington

G2-20035

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ *Surface Water* (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ *Ground Water* (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

CERTIFICATE NUMBER	PERMIT NUMBER	APPLICATION NUMBER	PRIORITY DATE
G2-20035C	G2-20035P	G2-20035	March 16, 1972

NAME
ARTHUR R. ANDERSON

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)
1982; 25th NE Seattle Washington

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	382

QUANTITY, TYPE OF USE, PERIOD OF USE
382 acre-feet per year community domestic supply continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1800 feet north and 900 feet east from south quarter corner of Sec. 18

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, E. OR W. W.M.	W.R.I.A.	COUNTY
	18	20	2 W	14	Mason

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
85		Timberlake No. 6

LEGAL DESCRIPTION OF PROPERTY WATER TO BE USED ON

The platted areas of Timber Lake: Divisions 1 through 13 as recorded with auditor of Mason County; said plats lying within parts of Secs. 7, 8, 17 and 18, T. 20 N., R. 2 W.W.M.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Olympia

APPLICATION FOR CHANGE TO CHANGE THE PLACE OF USE

TAKE NOTICE: That Timberlake Community Club, Incorporated has filed an application to change the place of use of public waters granted under Ground Water Certificates No. G 2-20036C and 6763-A which were issued for 350 gallons per minute (GPM) from Well #2 and 230 gallons per minute from Well #1 for community domestic supply located within Section 18, T. 20N., R. 2 W.W.M. Mason County, Washington.

Timberlake Community wishes to change the place of use to be able to provide water to three more homes from their existing system. The new legal will be: the platted areas of Timberlake Division 1-13 and tracts 1, 2 and 4 of Sur. 6-147 as recorded; said plats and tracts lying within parts of Section 7, 8, 17 and 18, T. 20 N., R. 2 W.W.M.

The gallons per minute and acre feet per year remain the same.

Protests or objections to approval of the application must include a detailed statement of the basis for objections; protests must be accompanied by a two dollar ($2.00) recording fee and filed with the Department of Ecology, Southwest Regional Office, P.O. Box 47775, Olympia, Washington 98504-7775 within thirty (30) days from August 31, 1995.

8/24-31 21

Place of Use

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
SUPERSEDING CERTIFICATE

CERTIFICATE OF WATER RIGHT

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendatory thereto, and the rules and regulations of the Department of Ecology)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendatory thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 16, 1972	G2-20035	G2-20035	G2-20035

NAME
Timberlake Community Club, Inc.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 38	Shelton	Washington	98584-0038

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown, but is limited to an amount actually beneficially used.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	382

QUANTITY, TYPE OF USE, PERIOD OF USE		
382 Acre-feet per year	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1,800 feet North and 900 feet East of the South quarter corner of Section 18.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼ SE¼	18	20	2W	14	Mason

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (BARE NAME OF PLAT OR ADDITION)
85		Timberlake No. 6

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The platted areas of Timberlake: Divisions 1 through 13 and Tracts 1, 2 and 4 of Survey 6/147 as recorded with auditor of Mason County; said plats lying within parts of Sections 7, 8, 17 and 18, T. 20 N., R. 2 W.W.M.

PROVISIONS

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

The right to the use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Olympia, Washington,

this 29th *day of* March, *19* 96.

Mary Riveland, Director

Department of Ecology

ENGINEERING DATA
OK

by

FOR COUNTY USE ONLY

290

Place of Use

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
CHANGE APPLICATION

REPORT OF EXAMINATION

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendatories thereto, and the rules and regulations of the Department of Ecology)

☒ Ground Water (issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendatories thereto, and the rules and regulations of the Department of Ecology)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
March 16, 1972	G2-20035	G2-20035	G2-20035

NAME
Timberlake Community Club, Inc.

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
PO Box 38	Shelton	Washington	98584-0038

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well #2

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	350	382

QUANTITY, TYPE OF USE	PERIOD OF USE	
382 Acre-feet per year	Multiple domestic supply	Year-round, as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION/WITHDRAWAL
1,800 feet North and 900 feet East of the South quarter corner of Section 18.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
NW¼ SE¼	18	20	2W	14	Mason

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
85		Timberlake No. 6

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The platted areas of Timberlake: Divisions 1 through 13 and Tracts 1, 2 and 4 of Survey 6/147 as recorded with auditor of Mason County; said plats lying within parts of Sections 7, 8, 17 and 18, T. 20 N., R. 2 W.W.M.

DESCRIPTION OF PROPOSED WORKS

An 8" X 400' well.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
n/a	n/a	n/a

REPORT

I recommend issuance of a superseding certificate under Application for Change of Water Right Certificate No. G2-20035 based on the following report:

BACKGROUND:

Pursuant to Chapters 90.03 and 90.44 Revised Code of Washington (RCW), Timberlake Community Club, Inc., applied for a change of the place of use of Water Right Certificate #G2-20035. The certificate authorizes withdrawal of 350 gallons per minute (gpm), 382 acre-feet per year, from a well (Well #2) for multiple domestic supply. Its priority date is March 16, 1972.

Legal notice of the change of the place of use was published in *The Shelton-Mason County Journal* on August 24 and 31, 1995. No protests were received as a result of this notice.

INVESTIGATIONS:

Timberlake Community Club, Inc., filed this application to obtain authorization to extend the service area of its two-well water system to serve three additional connections. This application covers Well #2; Well #1 is addressed under Application for Change #6763. Existing water rights authorize use of a maximum annual quantity of 750 acre-feet, which is sufficient to serve the proposed connections.

The Timberlake Community Water System serves a residential development approximately five miles east of Shelton in Mason County. The well is located on the southeast side of a gently-sloping divide located approximately 1/4 mile south of the lake.

Topographical information indicates that most of the current service area drains south and east to Campbell Creek and Oakland Bay. The remaining areas, including the new area to be served, drain south to Hammersley Inlet.

Because the Timberlake wells are located at a site which naturally drains toward Hammersely Inlet, ground water applied to the added service area should not adversely impact the flows of Campbell Creek. Also, because there will be no increase in withdrawal rate or annual quantity, approval of this change should not affect existing water rights.

CONCLUSION:

In accordance with Chapters 90.03 and 90.44 RCW, I find that the requested change of the place of use should not impair existing rights or be detrimental to public welfare.

RECOMMENDATIONS:

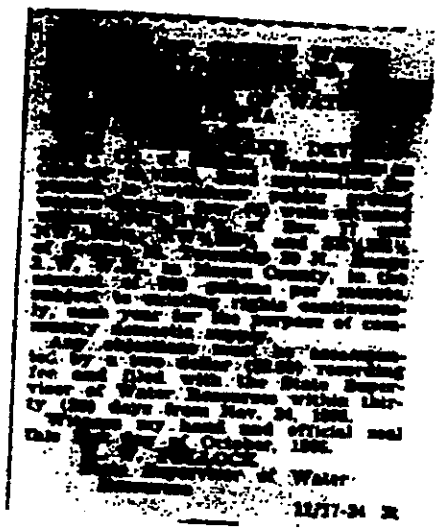
I recommend approval of this application and issuance of a superseding certificate which reflects the change in the place of use of Certificate #G2-20035.

Installation and maintenance of an access port as described in WAC 173-160-355 is required. An air line and gauge may be installed in addition to the access port.

An approved metering device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through -040 (installation, operation, and maintenance requirements are attached). Meter readings shall be recorded at least monthly.

REPORTED BY: _____ Date: February 13, 1996

No. G2-20035



Affidavit of Public

STATE OF WASHINGTON, }
COUNTY OF MASON } SS.

Henry G. Gay

on oath deposes and says that he is the pu
of THE SHELTON-MASON COUNTY JOURNA
That said newspaper is a legal newspaper and it
more than six months prior to the date of the
referred to, published in the English languag
newspaper in SHELTON, Mason County, Washin
during all of said time was printed in an office ma
place of publication of said newspaper. That the
COUNTY JOURNAL was on the 9th day of Aug
legal newspaper by the Superior Court of said M

That the annexed is a true copy of a

Notice of Ground Water Right

No. 8337

as it was published in regular issues (and no
tw
newspaper once each week for a period of
consecutive weeks, commencing on the

17 day of November 19 6

24 day of November 19 6

sive, and that such newspaper was regularly distri
during all of said period That the full amount of

foregoing publication is the sum of $ 6.09

Subscribed and sworn to before me this 24

November 19 96

Notary Public in and for the
Residing at Shelton.

CERTIFICATE RECORD NO. 14, PAGE NO. 6763-A

STATE OF WASHINGTON, COUNTY OF Mason

CERTIFICATE OF GROUND WATER RIGHT

(Issued in accordance with the provisions of Chapter 263 Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Water Resources thereunder.)

THIS IS TO CERTIFY That, TIMBERLAKE DEVELOPMENT COMPANY

of Seattle, Washington, has made proof to the satisfaction of the Department of Water Resources of a right to the use of the public ground waters of the State of Washington from a well (No. 1)

located within Lot 85, plat of Timberlake No. 6, within NW¼NE¼ of

Sec. 18, Twp. 20 N., R. 2 W. W.M.,

for the purpose(s) of community domestic supply

under and specifically subject to provisions contained in Ground Water Permit No. 8265

issued by the Department of Water Resources and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the Department of Water Resources and entered of record in Volume 14 at page 6763-A; that the priority of the right hereby confirmed dates from October 10, 1966; that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed 230 gallons per minute, 365 acre-feet per year, each year, continuously, for community domestic supply.

A description of the lands in which such ground water right is appurtenant is as follows:

Plats of Timberlake Nos. 1 through 6, within Secs. 7, 17 and 18, T. 20 N., R 2 W.W.M.

The right to use of water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390 and 90.44.020.

This certificate of ground water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

WITNESS the seal and signature of the Assistant Director, Division of Water Management, Department of Water Resources, affixed this 11th day of March, 1970.

Assistant Director
Division of Water Management
Department of Water Resources

Engineering Data
OK.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

November 15, 2007

Mont Jeffreys
Timberlake Community Club, Inc.
2880 East Timberlake West Drive
Shelton, WA 98584-7936

Dear Mr. Jeffreys:

Re: Showing of Compliance for an Additional Well under Water Right Certificates 6763 and G2-20035 for Timberlake Community Club Water System (DOH Water System ID#88370)

On November 13, 2007, the Department of Health forwarded copies of a notarized Showing of Compliance affidavit and supporting documents for an additional well drilled under Water Right Certificates 6763 and G2-20035. According to the date stamp visible on the copy, the original Showing of Compliance affidavit was received by the Department of Ecology's Southwest Regional Office on June 23, 2005. However, it was not processed at the time and the information was never incorporated into the appropriate water right files. Although we are unable to locate the original affidavit and supporting documents, we are accepting the copies as evidence of the 2005 filing.

Through this correspondence, the Department of Ecology is acknowledging receipt of a Showing of Compliance affidavit that appears to conform with the statutory mandates of RCW 90.44.100(3). We understand that an additional well, Well #3, was constructed on June 4, 2001 within Lot 85 of the plat of Timberlake No. 6 within the NW¼ of the SE¼ of Section 18, T. 20 N., R. 2 W.W.M. in Mason County. Timberlake Community Club Water System intends to pump Well #3 an additional source under both Water Right Certificates Nos. 6763 and G2-20035.

Because Ecology is not affirming the validity of the underlying water rights, superseding certificates will not be issued as a result of this filing. However, copies of the original notarized statement and supporting documents will be placed in each of the files associated with Certificates 6763 and G2-20035 as a permanent record, and the additional well will be included as an authorized point of withdrawal.

If you have any questions, please call me at (360) 407-0279.

Sincerely,

Marie Peter

Marie Peter
Water Resources Program

MP:th

Cc: Frank Meriwether, Department of Health

TIMBERLAKE COMMUNITY CLUB

WELL HEAD PROTECTION PROGRAM

Updated 2012

Source Protection
Chapter 5 of the approved 2010 Timberlake Community Club Comprehensive Water System Plan

5.1 Wellhead protection program

5.1.1 Overview

5.1.2 Completed Susceptibility Assessment

5.1.3 Delineated Wellhead Protection Area

5.1.4 Inventory of Potential Sources of Contamination

5.1.5 Notification of Finding

5.1.6 Contingency Plans

5.1.7 Spill/ Incident Response Measure

CHAPTER 5

SOURCE PROTECTION

This chapter is intended to develop a program to protect and improve the source water utilized by the Community. Any facilities and activities within the zone of contribution to the source wells, which may adversely impact the quality of the Community's source water, must be identified, monitored, limited and controlled to the greatest extent possible. Because the Community's sources include only groundwater wells, a surface water watershed protection program is not required. However, a wellhead protection program is required.

5.1 WELLHEAD PROTECTION PROGRAM

The Timberlake Community has not currently completed all the steps to implement the Community's wellhead protection program. The appropriate susceptibility assessments have been performed for all wells. The Community must still complete the contaminant source inventories for all wells. In addition, the Community must notify residents within the wellhead protection areas and local agencies regarding the formation of thorough contingency and spill response plans. These tasks will be highlighted as priority items requiring immediate attention and will be completed in a timely fashion.

5.1.1 Overview

The intent of the wellhead protection program is to reduce the potential risk for contamination of groundwater within the wellhead protection area. The components of wellhead protection outline individual programs for notifying potential contaminate sources, education and implementation of actions to protect groundwater supply and the creation of locally defined spill response procedures for spill incidents within the wellhead protection area. Once complete, the Community will coordinate the implementation of this plan with the local jurisdictions including the Mason County Health Department. The responsibility for administering the Wellhead Protection Program will be added to the responsibilities of the Timberlake Community.

5.1.2 Completed Susceptibility Assessment

Groundwater Contamination Susceptibility Assessment Survey forms for all three wells have been filed with the Department of Health as of July, 2007. See Appendix H for these forms.

5.1.3 *Delineated Wellhead Protection Area*

A wellhead protection area is defined as the surface and subsurface area surrounding a well that is used as a public water supply. It is within this area that contaminants are likely to pass and could eventually reach the water in the wells. The delineated areas for the Community's wells are provided in the illustrations located at the end of this Chapter. The susceptibility forms for each well are located in Appendix H.

If a spill of hazardous materials occurred in the protection area of a well, it could pose a direct risk to the drinking water supply for the Community. The method used to delineate the wellhead protection zones is the calculated fixed radius method. This method is part of the basic Washington State susceptibility assessment form. Utilizing this form, the calculated fixed radii were determined for the 6-month, 1-year, 5-year and 10-year time of travel for contaminants. The following table illustrates the size of the related zones of contribution for each of the Community's well in relation to the established travel times

TABLE 5.1
TIMBERLAKE COMMUNITY CLUB
Zone of Contribution for Wells (ft.)

	Well	*6 month*	*1 year*	*5 year*	*10 year*
Zone of Contribution for CWD Wells, radius in ft.	1	200	280	620	880
	2	700	980	2,200	3,110
	3	280	390	880	1,240

The Table 5.1 above illustrates the distance a contaminant may travel through the substrate around a particular well for a given period of time. For example, it's projected that it would take one year for a contaminant that was spilled 980 feet from Well #2 to reach the well.

There are potential contaminant sources that exist within the calculated wellhead protection zones for all of the Community's wells. These potential contaminant sources include:

- Potential residential on-site sewage disposal systems
- Potential agriculture activities such as pesticides from residential use
- Potential vehicular traffic-related spills
- Potential operations at Mason County Fire District 5, Station 5

- Potential activities effecting the Community's lakes

The possibility also exists for contamination from additional sources, which are unknown at this time. However, the limited development of the wellhead areas suggests that contamination should be minimal to non-existent. Figures 5.1 through 5.3, located at the end of this chapter, illustrate these areas in relation to the Community's boundaries.

5.1.4 *Inventory of Potential Sources of Contamination*

The purpose of creating an inventory of all potential sources of groundwater contamination in and around the wellhead protection areas is to identify past, present and proposed activities that may pose a threat to the aquifer utilized by the wells. The sources of available information include the State databases and personal historical knowledge of the area. Prior to the development of the Timberlake community, the area was generally forestland. There is little possibility of historical contamination points, unless a small amount of contamination occurred during construction of the community.

The Washington State Department of Ecology (DOE) tracks and monitors sites registered as toxic cleanup sites. In regard to the area surrounding the Community, DOE recognizes the Mason County Fire District 5, Station #5, as the only registered underground storage tank within one mile of the Water System see Appendix H. This facility is also the only business allowed in the wellhead protection area per the covenants of the Community.

5.1.5 *Notification of Findings*

Upon completion of the documents, the Timberlake Community will notify State and local agencies of the wellhead protection program's findings including the wellhead protection boundaries. They will also notify residents and customers within the contribution zone radii with a letter discussing the risks to groundwater and actions to be taken in case of a spill or accidental contamination. The letter will include a list of precautions they can take to minimize impacts from on-site sewage disposal systems.

5.1.6 *Contingency Plans*

In the event of a ground water source contamination event, the affected well or wells would be shut down and the Community would rely on the other sources for service if possible. Since all of the Community's wells are within 800 feet of each other, all wells would be closely monitored for contamination. Depending on the location of the contamination, the level of effort required to provide service from remaining the wells could range from a very simple to a labor-intensive operation.

Once the contamination is detected, the Community would isolate the affected well or wells and any contaminated portions of the distribution system. The Community would then disinfect, flush and test the distribution system in order to restore service to these areas. Once service has been restored, the Community would concentrate on restoring the affected wells if possible.

Should the well be contaminated beyond the point of being used, the Community would evaluate the use of the other wells as the primary point of withdrawal. Since the wells are in such close proximity to each other there is a strong possibility the other wells could become contaminated. The alternative to utilizing the remaining wells is the construction of a new well at another location.

This is a feasible concept considering the Community owns various other parcels of land within the service area. However. Drilling a new well would take time and the costs are estimated to be close to $150,000.

5.1.7 *Spill / Incident Response Measure*

The local Fire District, the Mason County Health Department and the County Emergency Services Departments will be informed of the wellhead protection area boundaries. Procedures for response to a spill incident within the wellhead protection area will be developed by the local emergency service organizations.

The following are Wellhead Protective Covenants for the Timberlake Community Club Well Head Protection Program

The Declaration of Covenant for Timberlake Community club and the restrictive covenants.

The restrictive covenants do not need to be a part of The Wellhead Protection Program because a variance of the required radius of control was approved by the DOH in 2001 , a request for the variance and the approval of the variance are included in this program for documentation purposes.

1905494 MASON CO WA
09/14/2007 09:31 AM DECL
TIMBERLAKE COMMUNITY CLUB INC #12180 Rec Fee: $50.00 Pages: 11

After Recording Return To:
Timberlake Community Club
2880 East Timberlake West Drive
Shelton, Washington 98584-7936

DECLARATION OF COVENANT

The grantor, Timberlake Community Club, a Washington corporation, is the owner in fee simple of the following described real estate situated in Mason County, State of Washington; to wit:

> Lot 85, Plat of Timberlake No 6, as recorded in Volume 6 of Plats, pages 184 through 187, records of Mason County, Washington. Parcel # 22018 54-00085

On which the grantor owns and operates a well and waterworks supplying water for public use located on said real estate at:

> 79.8 feet South and 106.4 feet West of the Northwest corner of Lot 85, Plat of Timberlake No. 6 as described and shown on attachment "A".

and grantor is required to keep the water supplied from said well free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to prevent certain practices hereinafter enumerated in the use of said grantor's water supply.

NOW, THEREFORE, the grantor agrees and covenants that said grantor, its successors and assigns will not construct, maintain, or suffer to be constructed or maintained upon the said land of the grantor and within 100 (One Hundred) feet of the well herein described, so long as the same is operated to furnish water for public consumption, any potential source of contamination, such as septic tanks and drainfields, sewerlines, underground storage tanks, roads, railroad tracks, vehicles, structures, barns, feed stations, grazing animals, enclosure for maintaining fowl or animal manure, liquid or dry chemical storage, herbicides, insecticides, hazardous waste, or garbage of any kind or description.

These covenants shall run with the land and shall be binding to all parties having or acquiring any right, title or interest in the land described herein or any part thereof, and shall inure to the benefit of each owner thereof.

WITNESS our hand this 12th day of September, 2007.

Clay Long, President

Linda Bruder, Secretary

State of Washington)
) ss
County of Mason)

On this day, personally appeared before me Clay L. Long, personally known by me to be the President and Linda Bruder, personally known by me to be the Secretary of Timberlake Community Club, the corporation that executed the foregoing instrument and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute said instrument.

WITNESS my hand and official seal the day and year first above written.

LINDA R. SPRINGER NOTARY SEP 20, 2010 PUBLIC STATE OF WASHINGTON

Linda R. Springer

PRINT NAME: Linda Springer
NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON, residing in Shelton.
My commission expires: September 20, 2010

WHEN RECORDED, RETURN TO:

Mont Jeffreys
Timberlakes Community Club, Inc.
2880 E Timberlake Drive West
Shelton, WA 98584-7936
360-427-0109

WELLHEAD PROTECTION COVENANT

GRANTOR: Ruben and Maralyn Budd

GRANTEE: Timberlake Community Club, Inc., a Washington Corporation

LEGAL DESCRIPTION: Portion of the NW ¼ of the SE ¼, Section 18, Township 20 north, Range 2 west WM

PARCEL NOS: 22018 54 00029

The Grantor(s), Ruben and Maralyn Budd, are the owners of the following described real property situated in Mason County, State of Washington:

> Lot 29, Timberlake No. 6, according to the plat thereof, recorded in Volume 6 of Plats, Page 184, records of Mason County, Washington

The Grantee, Timberlake Community Club, Inc., is the owner and operates wells and waterworks supplying water for public use, located upon the following described real property situated in Mason County, State of Washington:

> Parcel No: 220185400085

Which wells and waterworks are in close proximity to the land of the Grantor and said Grantee is required to keep the water supplied form the wells free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to protect the Grantee's wells from activities in the use of said Grantor's land that would contaminate the aquifer in proximity to the wells operated or proposed by Grantee.

NOW, THEREFORE, the Grantor agrees and covenants with said Grantee, its successors and assigns, that it will not engage in activities that would introduce contaminants, as defined in Chapter 246-290-010 WAC, into the ground water beneath said land of the Grantor, hereinafter described, so long as the wells are used to furnish water for public consumption:

That portion of a 100-foot radius lying in the NE corner of Lot 29, encompassing a 15' x 20' corner, as shown on attached map.

These covenants shall run with the Grantor's land and shall be binding upon the Grantor's successors and assigns and to all parties having or acquiring any right, title or interest in the land described herein or any party thereof, and shall inure to the benefit of the land of the Grantee, its successors and assigns.

_____ I/We accept the provisions of this document.

__X__ I/We do not accept the provisions of this document.

Dated this 18th day of January 2000, at Tacoma, WA

RUBEN AND MARALYN BUDD

By Ruben E Budd

Maralyn B. Budd

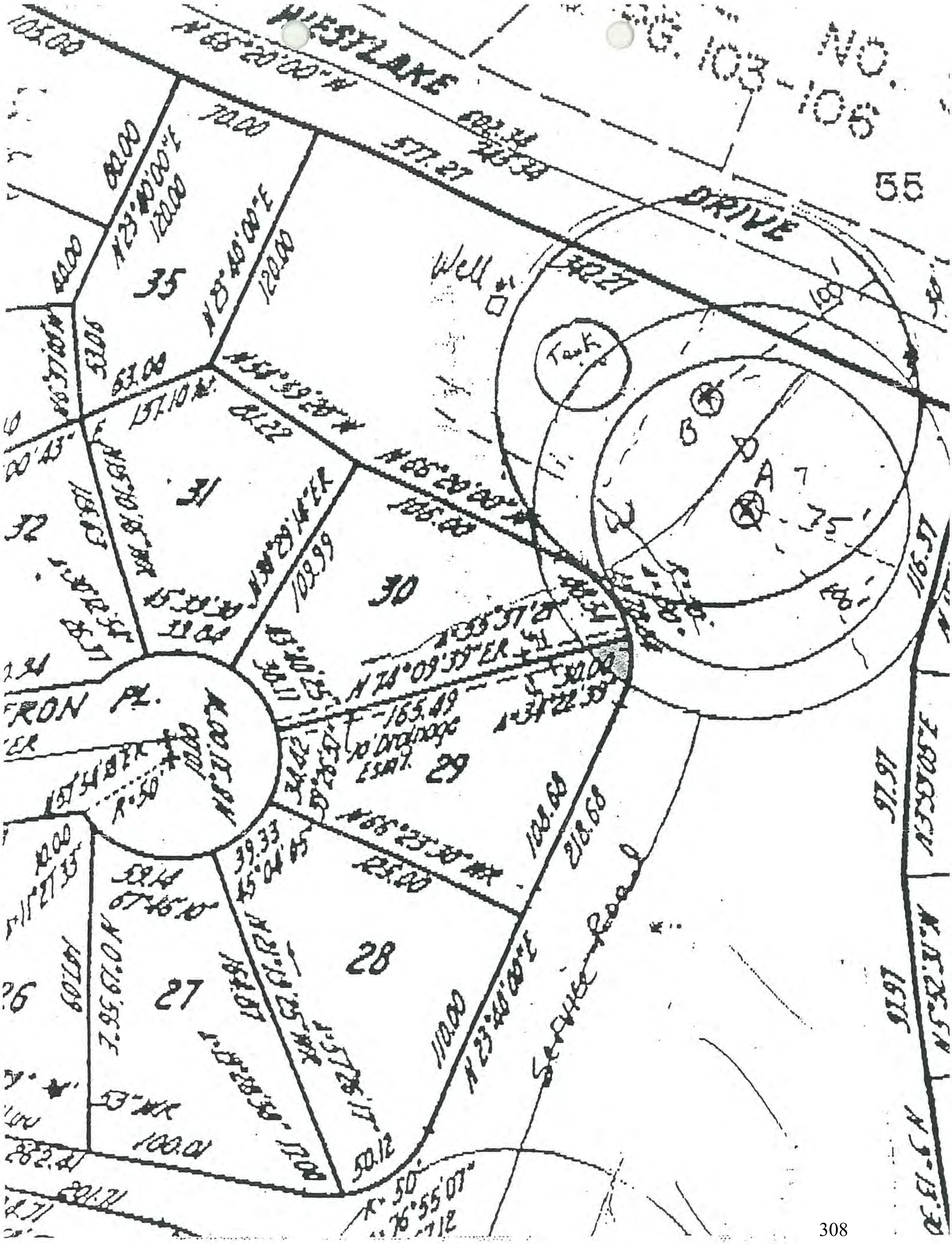
STATE OF WASHINGTON)
)
COUNTY OF MASON)

On this day personally appeared before me, Ruben and Maralyn Budd, that executed the within and foregoing Wellhead Protection Covenant, and acknowledged the said instrument to be the free and voluntary act and deed of said individual(s), for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute the said instrument on behalf of the individual.

GIVEN under my hand and official seal this 18th day of January, 2000.

Evelyn J. Bieber

Notary Public in and for the State of Washington
Residing at Lakewood
Printed Name: Evelyn J. Bieber
My Commission expires: 3/20/02


WESTLAKE
DRIVE
PG. 103-106
NO.
55
Well
Tank
35
31
30
29
28
27
PL.
10' Drainage Esmt.
Service Road
165.49
108.99
120.00
110.00
50.12
100.01
282.41
577.27

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "*Return Receipt Requested*" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

3. Article Addressed to:
Ruben Budd
1172 BROOKDALE E
TACOMA, WA 98444-3601

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery
Consult postmaster for fee.

4a. Article Number
7000 0520 0015 2681 1635

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery

5. Received By: *(Print Name)*
Michael Budd
Mike Budd

8. Addressee's Address *(Only if requested and fee is paid)*

6.

PS Form

Receipt

Thank You for using Return Receipt Service.

TIMBERLAKE COMMUNITY CLUB, INC.
2880 East Timberlake Dr West
Shelton, WA 98584-7936
360-427-8928 ~ Fax 360-427-1755

This property Purchased By TLCC April 2014

November 28, 2000

Tracey Kastner
8324 133rd Avenue NE
Redmond, Washington 98052

RE: Wellhead Protection Covenant

Dear Mr. Kastner,

Timberlake Community Club, Inc. is adding an additional well to ensure an adequate water supply for future growth of the community.

The locations that have been recommended by our engineers will require a Well Head Protection Covenant agreement that will affect the location of a residence and/or septic system on your property.

As we discussed on the phone, we have enclosed the documents for you to agree, or object to this covenant restriction. Please initial your choice as indicated and sign the document before a Notary Public as required. It is important that we get your answer back as soon as possible so that we can proceed with the permit process and construction.

If you have any questions please do not hesitate to call me at 360-427-0109.

We have enclosed a self addressed stamped envelope for your convenience and expediency.

Sincerely,

Mont Jeffreys
Water Distribution Manager

WHEN RECORDED, RETURN TO:

Mont Jeffreys
Timberlakes Community Club, Inc.
2880 E Timberlake Drive West
Shelton, WA 98584-7936
360-427-0109

WELLHEAD PROTECTION COVENANT

GRANTOR: TRACEY KASTNER

GRANTEE: Timberlake Community Club, Inc., a Washington Corporation

LEGAL DESCRIPTION: Portion of the NW ¼ of the SE ¼, Section 18, Township 20 north, Range 2 west WM

PARCEL NOS: 22018 54 00030

The Grantor, TRACEY KASTNER, is the owner of the following described real property situated in Mason County, State of Washington:

> Lot 30, Timberlake No. 6, according to the plat thereof, recorded in Volume 6 of Plats, Page 184-187, records of Mason County, Washington.

The Grantee, Timberlake community Club, Inc., is the owner and operates wells and waterworks supplying water for public use, located upon the following described real property situated in Mason County, State of Washington:

> Parcel No: 2200185400085

Which wells and waterworks are in close proximity to the land of the Grantor and said Grantee is required to keep the water supplied form the wells free from impurities which might be injurious to the public health.

It is the purpose of these grants and covenants to protect the Grantee's wells from activities in the use of said Grantor's land that would contaminate the aquifer in proximity to the wells operated or proposed by Grantee.

NOW, THEREFORE, the Grantor agrees and covenants with said Grantee, its successors and assigns, that it will not engage in activities that would introduce contaminants, as defined in Chapter 246-290-010 WAC, into the ground water beneath said land of the Grantor, hereinafter described, so long as the wells are used to furnish water for public consumption:

That portion of a 100-foot radius lying in the NE corner of Lot 30 encompassing a 25' x 50' corner as shown on attached map.

These covenants shall run with the Grantor's land and shall be binding upon the Grantor's successors and assigns and to all parties having or acquiring any right, title or interest in the land described herein or any party thereof, and shall inure to the benefit of the land of the Grantee, its successors and assigns.

_____ I/We accept the provisions of this document.

__X__ I/We do not accept the provisions of this document.

Dated this 7th day of Dec 2000, at JUANITA, WA

TRACEY KASTNER

By Tracey Kastner

STATE OF WASHINGTON)
)
COUNTY OF ~~MASON~~ King)

On this day personally appeared before me, Tacey Kastner, that executed the within and foregoing Wellhead Protection Covenant, and acknowledged the said instrument to be the free and voluntary act and deed of said individual(s), for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute the said instrument on behalf of the individual.

GIVEN under my hand and official seal this 7th day of Dec, 2000.

PAT HOYRUP COMM. EXP. NOTARY PUBLIC JULY 4, 2001 STATE OF WASHINGTON

Pat Hoyrup

Notary Public in and for the State of Washington
Residing at Issaquah WA
Printed Name: PAT HOYRUP
My Commission expires: 7-4-01

Page 2

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:

Tracey Kastner
8324 133rd Ave NE
Redmond, WA 98052

4a. Article Number
P 000 0520 0015 2681 1847

4b. Service Type
☐ Registered ☒ Certified
☐ Express Mail ☐ Insured
☐ Return Receipt for Merchandise ☐ COD

7. Date of Delivery

5. Received By: (Print Name)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)
X

PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

Thank you for using Return Receipt Service.

ROBINSON & NOBLE, INC.
GROUNDWATER & ENVIRONMENTAL GEOLOGISTS
ESTABLISHED 1947

January 17, 2001

Mark Toy
Washington Department of Health
P.O. Box 47823
Olympia, WA 98504-7823

Subject: Request for a variance in the required radius of control for Timberlake Community Club's Well 3.

Dear Mark:

Timberlake Community Club, Inc. is seeking a variance on the 100-foot radius of control for its production Well 3 due to property constraints. The Timberlake Community Club has requested that Robinson & Noble, Inc. review the hydrogeologic aspects of the site and provide the Department of Health with a description of the site conditions as they relate to the technical support for the variance.

The well, under Water Rights G2-20035C and G2*8337-6763C (T20N/R2W-18), is to be drilled to approximately 400 feet below ground. The geology of the site, based the well logs of Timberlake's nearby Wells 1 and 2, affords appreciable protection of the source aquifer from any land surface activities. The near-surface geology penetrated by this well includes a clay to approximately 4 feet, and till (logged as Hardpan) to approximately 61 feet (log for Well 1 attached). The surface seal for the well is to be placed into this low-permeability material. The target aquifer is located at depths from approximately 330 to 400 feet. Between the surface deposits and the aquifer, multiple layers of clay and cemented gravel are expected. This low permeability material will greatly restrict the downward migration of any contaminant introduced at or near land surface.

The geology clearly provides a more than adequate protection against the transfer of contaminants vertically to the aquifer. The completion methods to be used assure that the well will be safe from any contamination that might arise in the near surface.

After the best location of the new well was selected, it was obvious that the 100-foot radius of control overlapped two nearby parcels. An attempt was made to contact the owners of the two undeveloped parcels (Tracey Kastner and Ruben and Maralyn Budd) to request a wellhead protection covenant (attached). Our requests were denied. Note that the Budd request has not been returned but they have stated their intent to deny. Therefore, we are requesting a 75-foot radius, which would fit the site and not impose on nearby parcels.

We believe a 75-foot radius of control around this well will afford appreciably more protection than is necessary to protect public health. It is clear to us that the geologic characteristics of the site, in conjunction with the well design, will provide the needed protection for this well. We therefore request that the source be authorized as a production source with a variance from the standard 100-foot radius of control to a 75-foot radius of control.

5320 Orchard Street West ▪ Tacoma, Washington 98467 ▪ (253) 475-7711 ▪ Fax: (253) 472-5846
email: mail@robinson-noble.com

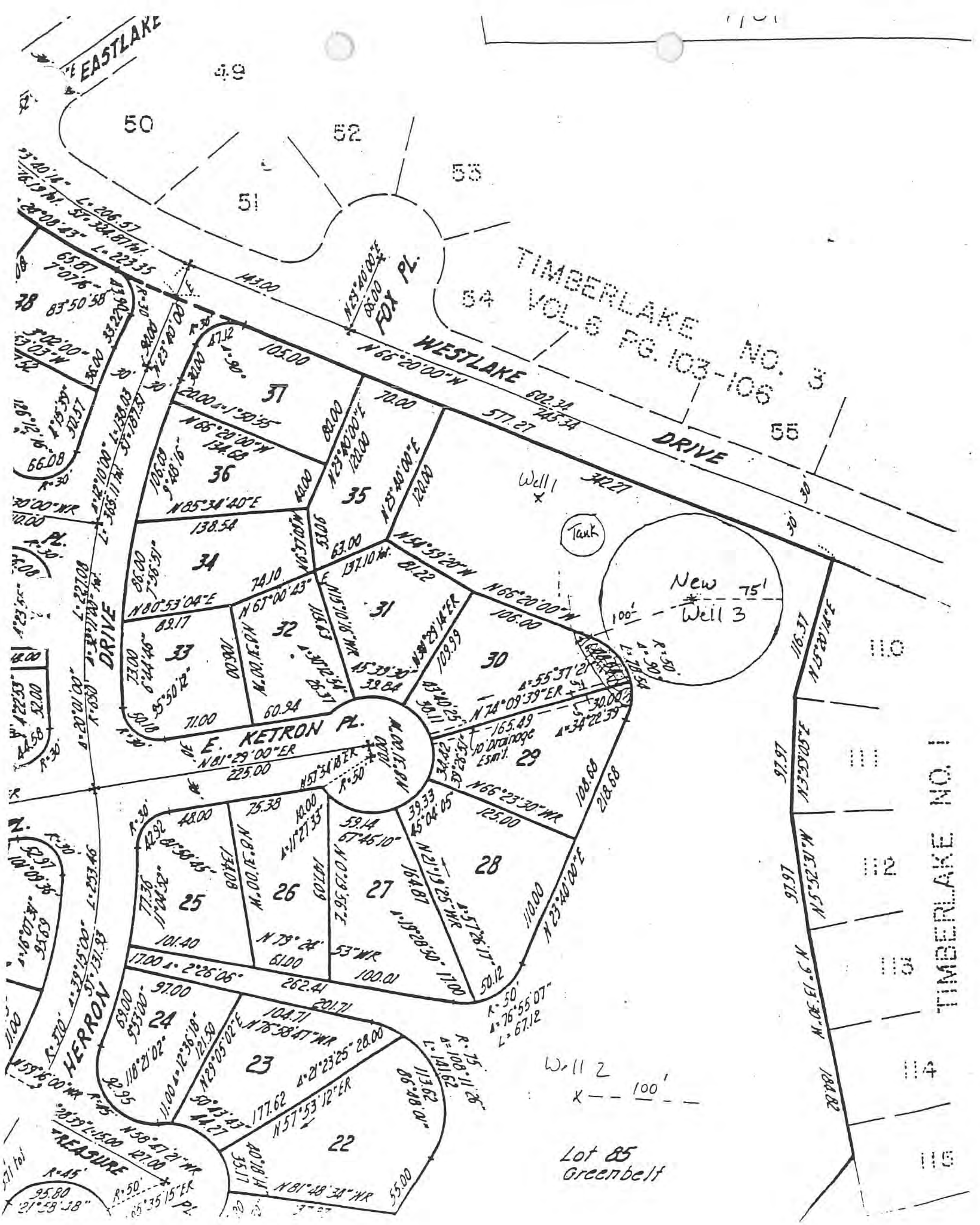
Thank you for your assistance in this matter. If you have any questions, or if you need additional information in the processing of the variance, please contact us.

Very truly yours
Robinson & Noble, Inc.

Joel W. Purdy
Principal Hydrogeologist

attachments

cc: Mont Jeffreys, Timberlake CC


EASTLAKE
49
50
51
52
53
54
55
FOX PL.
TIMBERLAKE NO. 3
VOL. 6 PG. 103-106
WESTLAKE DRIVE
Well 1
Tank
New Well 3
100'
75'
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
E. KETRON PL.
HERRON DRIVE
TREASURE PL.
Well 2
100'
Lot 85
Greenbelt
110
111
112
113
114
115
TIMBERLAKE NO. 1

STATE OF WASHINGTON
DEPARTMENT OF HEALTH
SOUTHWEST DRINKING WATER OPERATIONS
2411 Pacific Ave. • P.O. Box 47823 • Olympia, Washington 98504-7823
(360) 664-0768 • FAX (360) 664-8058
TDD Relay Service: 1-800-833-6388

February 2, 2001

Mont Jeffries
Timberlake Community Club Inc.
2880 East Timberlake Drive West
Shelton, Washington 98584

Dear Mr. Jeffreys:

Subject: Timberlake Community Club Inc., ID #88370Y, Mason County; Source Approval Well #3, DOH Project #01-0112

A well site inspection was conducted on January 29, 2001, in response to your request for a variance in the required radius of control for the proposed well #3 due to the refusal of neighbors to grant a restrictive covenant on their property. Based on this inspection and the submittal from your hydrogeologist received on January 19, 2001, your variance request is **APPROVED** provided that:

- Culvert drainage to the proposed well site is routed away from the well.
- The sanitary seal is installed a minimum depth of 18 feet or into the first confining layer, whichever is greater.

The following is necessary in order for the Department of Health (Department) to approve the proposed source:

1. A map of the site and vicinity including township, range, well location, pump house, water lines, ground slope, sanitary protection area, location of potential sources of contamination including septic systems, sanitary sewers, storage sheds, roads, driveways, etc., and site drainage.

2. A well construction report.

3. Water right permit, certificate, or claims issued by the Department of Ecology, including completed Water Right Self-Assessment Form.

4. Copies of legal documents (easements or covenants) for the sanitary control area per WAC 246-290-210.

5. A susceptibility assessment per WAC 246-290-135.

6. Site piping plans including valving, sample taps for raw and finished water, source meter, and location, size, type, and class of pipe.

7. Pump house details including pump control logic, emergency alarm systems, casing and pump house slab elevations, water level measuring device, and electrical connections to allow the use of emergency power.

8. Pumping equipment specifications including HP, GPM, head (TDH), pump controls and alarm system. The specific pump curve being used and operation range of head and flow conditions must be clearly indicated on the pump curve. A narrative discussion of the ability of the source and pumping system to supply peak daily water volumes must also be included. A demonstration of source pump control and pump cycle protection must also be included.

Construction documents addressing items 6,7, and 8 must bear the seal, date, and signature of a professional engineer licensed in the State of Washington per WAC 246-290-040.

9. Results for the following water quality tests:

   a) Bacteriological/coliform test;
   b) Inorganic chemical and physical analysis (ICHEM);
   c) Volatile organic chemical (VOC) test;
   d) Radionucleide (RAD) test;
   e) Synthetic organic chemical test (SOC) test, unless it can be demonstrated that the source can meet DOH requirements for monitoring waiver.

Regulations establishing a schedule of fees for review of planning, engineering and construction documents were adopted February 1, 2000 (WAC 246-290-990). An itemized bill for $612 is enclosed.

Please contact me at (360) 586-5209 if you have any questions.

Sincerely,

MARK TOY
WSDOH Regional Engineer

Enclosures

cc: Stephanie Kenny, Mason County Health Services
Joel Purdy, Robinson & Noble, Inc.

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.1

Mailed return receipt 6/14/94

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Tom Macias WDM-1

Water system name : Timberlakes Community club

County: Mason

Water system number: 88370Y Source number: 501

Well depth: 380 (ft.) (*From WFI form*)

Source name: well #1

WA well identification tag number: ___ ___ ___-___ ___ ___

✓ well not tagged

Number of connections: 341 Population served: 915

Township: 20N Range: 02W

Section: 18 1/4 1/4 Section: SW/NE

Latitude/longitude (if available): _____/_____

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map
____other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 3 / 8 / 67 month/day/year

last reconstruction: 3 / 8 / 67 month/day/year

_____ information unavailable

2) Well driller: Bedell Drilling Co.
1585 E Dickenson
Shelton Wa. 98584

__ well driller unknown

3) Type of well:

✓ Drilled: __ rotary __ bored ✓ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? ✓ YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 180 (gallons/min)

Source of information: Engineer report 9-8-82

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

✓ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

7) If source is chlorinated, is a chlorine residual maintained: ✓ YES __ NO

Residual level: 0.6 ppm *(At the point closest to the source.)*

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ 100–200 ft ✓ > 200 ft

___ information unavailable (*'< ' means less than; '> ' means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ✓ > 100 ft

___ flowing well/spring (artesian)

How was water level determined?

✓ well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO

5) Wellhead elevation (height above mean sea level): 240 (ft)

How was elevation determined? ___ topographic map ✓ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

✓ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? ✓ YES ___ NO

___ information unavailable

7) Sanitary setback:

✓ < 100 ft* ___ 100-120 ft ___ 120-200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

Pump House

8) Wellhead construction:

✓ wellhead enclosed in a wellhouse

___ controlled access (describe): _____

___ other uses for wellhouse (describe): _____

___ no wellhead control

9) Surface seal:

___ 18 ft

✓ < 18 ft (no Department of Ecology approval) ('< ' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('< ' *means less than*)

___ > 18 ft ('> ' *means greater than*)

___ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

___ < 10 in/yr ___ 10-25 in/yr ✓ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 13,070 (gallons)

How was this determined?

✓ meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 200 (ft)

1 year ground water travel time : 280 (ft)

5 year ground water travel time: 620 (ft)

10 year ground water travel time: 880 (ft)

Information available on length of screened/open interval?

✓ YES ___ NO

Length of screened/open interval: 20 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES ✓ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES ✓ NO (mark and identify on map).

Comments: _____

_____

_____

_____

_____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application	___	___	___	___
stormwater injection wells	___	___	___	___
other injection wells	___	___	___	___
abandoned ground water well	___	___	___	___
landfills, dumps, disposal areas	___	___	___	___
known hazardous materials clean-up site	___	___	___	___
water system(s) with known quality problems	___	___	___	___
population density > 1 house/acre	✓	✓	✓	___
residences commonly have septic tanks	✓	✓	✓	___
Wastewater treatment lagoons	___	___	___	___
sites used for land application of waste	___	___	___	___

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL	___	___
< 2 mg/liter nitrate	✓	___
2-5 mg/liter nitrate	___	___
> 5 mg/liter nitrate	___	___
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL	___	___
VOCs detected at least once	✓	___
VOCs never detected	___	___
___ VOC sampling records unavailable		

C. EDB/DBCP:	YES	NO
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)		
EDB/DBCP detected below MCL at least once	___	___
EDB/DBCP detected above MCL at least once	___	___
EDB/DBCP never detected	___	___
___ EDB/DBCP tests required but not yet completed		
✓ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected	___	___
(pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected		
(list test methods in comments		
✓ Other SOC tests not performed		

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	✓
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	✓

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

___ YES ✓ NO

Describe with references to map produced in Part IV:

_____

_____

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES ✓ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

✓ YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

__ YES ✓ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	__	✓	__
6 month–1 year travel time	__	✓	__
1–5 year travel time	__	✓	__
5–10 year travel time	__	✓	__

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	__	✓	__
1–5 year travel time	__	✓	__
5–10 year travel time	__	✓	__

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

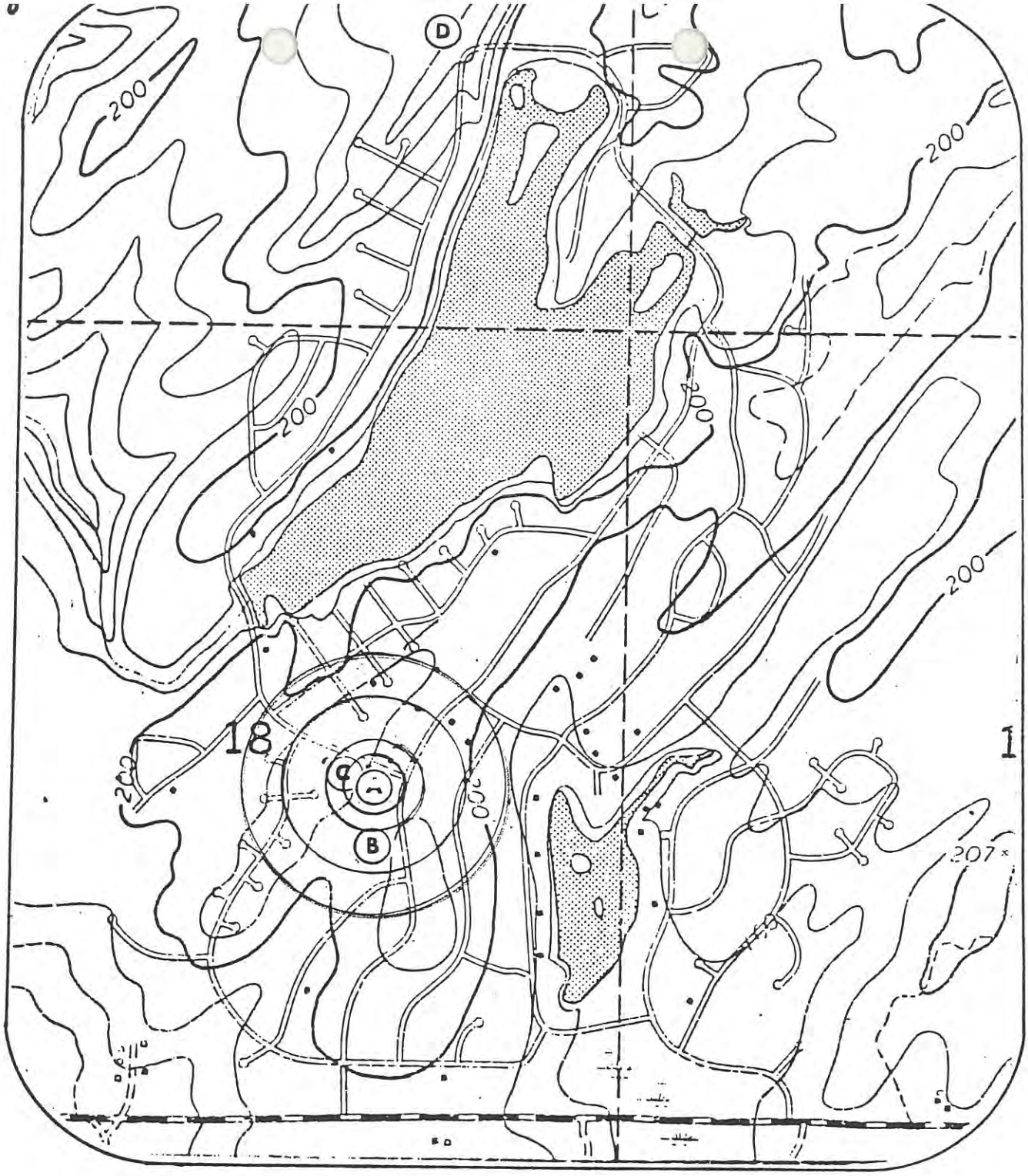
Suggestions and Comments

Did you attend one of the susceptibility workshops? __ YES ✓ NO

Did you find it useful? __ YES __ NO

Did you seek outside assistance to complete the assessment? __ YES ✓ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.



SOURCE OF SUPPLY FACILITIES

(A) Well No. 1 (B) Well No. 2 (C) 60,000 Gallon Reservoir

(D) Proposed Location for Future Storage and/or Booster Pumps

Open Interval - 20'

Annual Volume of Water Pumped - 13,070 g.lyr.

Map Scale: 12,000:1 (Residential Area)

or > 1 house Per Acre

1" = 1000'

(A) Well #1

Ground Water Contamination Susceptibility Assessment Survey Form

Version 2.1

Mailed return receipt 6/1/94

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Tom Macias WDM-1

Water system name : Timberlakes Community club

County: Mason

Water system number: 88370Y Source number: S02

Well depth: 400' (ft.) (*From WFI form*)

Source name: Well #2

WA well identification tag number: 22035

✓ well not tagged

Number of connections: 341 Population served: 915

Township: 20N Range: 2W

Section: 18 1/4 1/4 Section: NW, SE

Latitude/longitude (if available): _____ / _____

How was lat./long. determined?

_____ global positioning device _____ survey _____ topographic map
_____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 6 / 19 / 71 month/day/year

last reconstruction: 6 / 19 / 71 month/day/year

_____ information unavailable

2) Well driller: Bedell Drilling Co.
1585 E. Dickinson
Shelton Wa. 98584

__ well driller unknown

3) Type of well:

✓ Drilled: __ rotary __ bored ✓ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other: _____

Additional comments: _____

4) Well report available? ✓ YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 275 (gallons/min)

Source of information: Engineers report 3/10/82

If not documented, how was pumping rate determined? _____

__ Pumping rate unknown

6) Is this source treated? yes

If so, what type of treatment:

✓ disinfection __ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Iron + Manganese

7) If source is chlorinated, is a chlorine residual maintained: ✓ YES __ NO

Residual level: 0.6 ppm *(At the point closest to the source.)*

PART III: Hydrogeologic Information

1) Depth to top of open interval: [check one]

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ___ 100–200 ft ✓ > 200 ft

___ information unavailable (*'< ' means less than; '> ' means greater than*)

2) Depth to ground water (static water level):

___ < 20 ft ___ 20–50 ft ___ 50–100 ft ✓ > 100 ft

___ flowing well/spring (artesian)

How was water level determined?

✓ well log ___ other: _____

___ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: ___ YES ___ NO

5) Wellhead elevation (height above mean sea level): 210 (ft)

How was elevation determined? ___ topographic map ✓ Drilling/Well Log ___ altimeter

___ other: _____

___ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

✓ evidence of a confining layer in well log

___ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the top of the open interval? ✓ YES ___ NO

___ information unavailable

7) Sanitary setback:

___ < 100 ft* ___ 100-120 ft ✓ 120-200 ft ___ > 200 ft
* if less than 100 ft describe the site conditions:

_____

_____

_____

_____

8) Wellhead construction:

✓ wellhead enclosed in a wellhouse

___ controlled access (describe): _____

_____

___ other uses for wellhouse (describe): _____

_____

___ no wellhead control

9) Surface seal:

___ 18 ft

___ < 18 ft (no Department of Ecology approval) ('<' *means less than*)

___ < 18 ft (Approved by Ecology, include documentation) ('<' *means less than*)

___ > 18 ft ('>' *means greater than*)

✓ depth of seal unknown

___ no surface seal

10) Annual rainfall (inches per year):

___ < 10 in/yr ___ 10-25 in/yr ✓ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 39.4 m/(gallons)

How was this determined?

✓ meter

___ estimated: ___ pumping rate (_____)

___ pump capacity (_____)

___ other: _____

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 700 (ft)

1 year ground water travel time : 980 (ft)

5 year ground water travel time: 2,200 (ft)

10 year ground water travel time: 3110 (ft)

Information available on length of screened/open interval?

✓ YES ___ NO

Length of screened/open interval: 10 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? ___ YES ✓ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? ___ YES ✓ NO (mark and identify on map).

Comments: Shaded areas on Map, Marked with an (E) represents Lakes.
NOTE: Lakes are Located withen 5 yr. + 10 yr. Travel Time only.

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application				
stormwater injection wells				
other injection wells				
abandoned ground water well			✓	
landfills, dumps, disposal areas				
known hazardous materials clean-up site				
water system(s) with known quality problems				
population density > 1 house/acre	✓	✓	✓	
residences commonly have septic tanks	✓	✓	✓	
Wastewater treatment lagoons				
sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (*Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.*)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. Nitrate: (Nitrate MCL = 10 mg/l)	YES	NO
Results greater than MCL		
< 2 mg/liter nitrate	✓	
2–5 mg/liter nitrate		
> 5 mg/liter nitrate		
___ Nitrate sampling records unavailable		

B. VOCs: (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES	NO
Results greater than MCL or SAL		
VOCs detected at least once	✓	
VOCs never detected		
___ VOC sampling records unavailable		

C. EDB/DBCP: (EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	YES	NO
EDB/DBCP detected below MCL at least once		
EDB/DBCP detected above MCL at least once		
EDB/DBCP never detected		
___ EDB/DBCP tests required but not yet completed		
✓ EDB/DBCP tests not required		

D. Other SOCs (Pesticides):	YES	NO
Other SOCs detected (pesticides and other synthetic organic chemicals)		
___ Other SOC tests performed but none detected (list test methods in comments		
✓ Other SOC tests not performed		

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

_____

_____

_____

E. Bacterial contamination:

	YES	NO
Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records).	___	✓
Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source.	___	✓

___ Source sampling records for bacteria unavailable

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

✓ YES ___ NO

Describe with references to map produced in Part IV:

(E) on Map shows Two Lakes within CFR. (Shaded Areas)

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

___ YES ✓ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

✓ YES ___ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES ✓ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	✓	___
6 month–1 year travel time	___	✓	___
1–5 year travel time	___	✓	___
5–10 year travel time	___	✓	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	✓	___
1–5 year travel time	___	✓	___
5–10 year travel time	___	✓	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

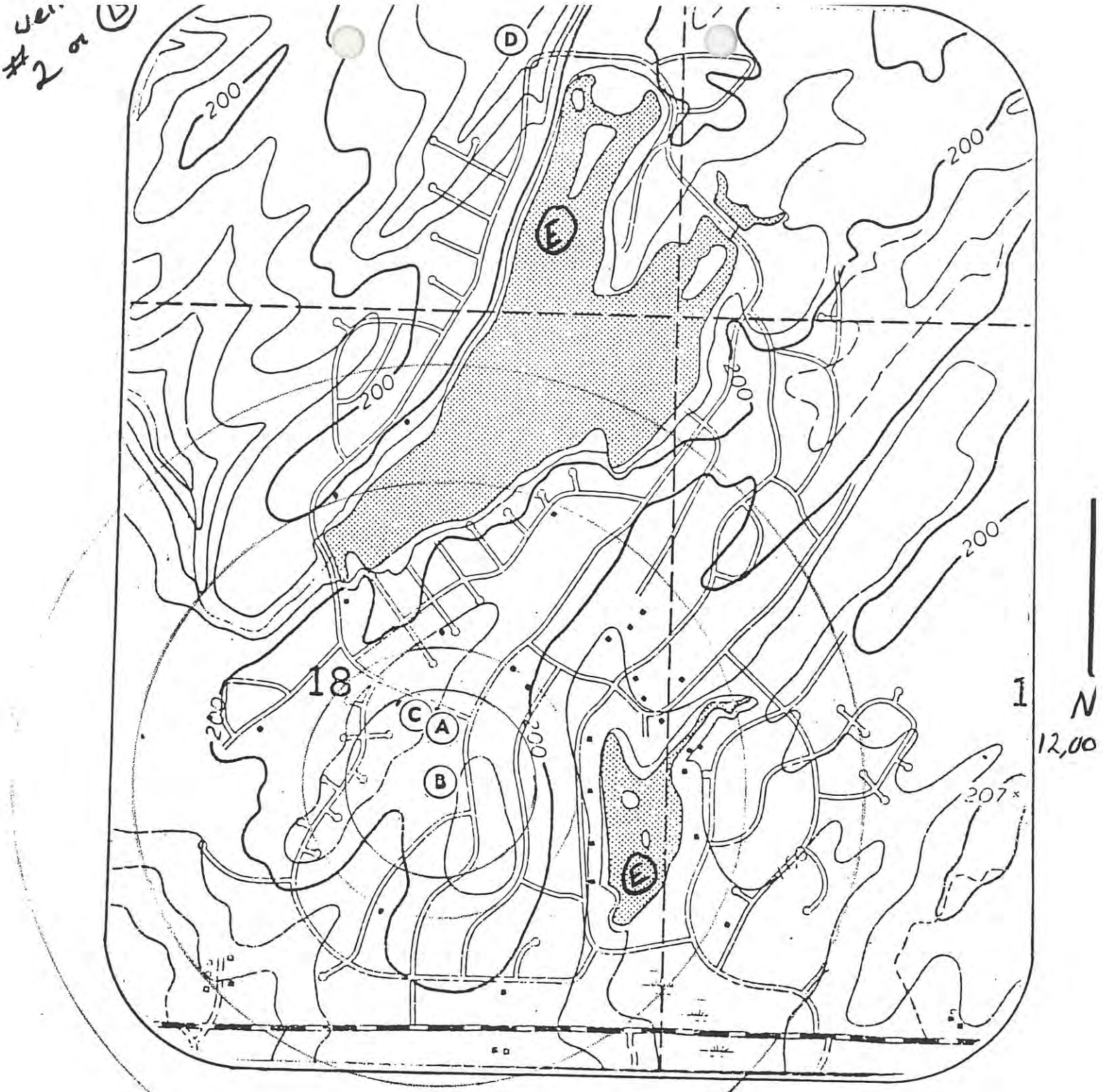
Suggestions and Comments

Did you attend one of the susceptibility workshops? __ YES ✓ NO

Did you find it useful? __ YES __ NO

Did you seek outside assistance to complete the assessment? __ YES ✓ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.



SOURCE OF SUPPLY FACILITIES

(A) Well No. 1 (B) Well No. 2 (C) 60,000 Gallon Reservoir

(D) Proposed Location for Future Storage and/or Booster Pumps

(E) Lakes (2) - Shaded Areas

Annual Volume of Water Pumped - 39.4 m/g

Open Interval - 10 ft., Residential Area > 1 house per Acre

Map Scale - 12,000:1 - 19 - or 1" = 1000'

Ground Water Contamination
Susceptibility Assessment Survey Form
Version 2.2

IMPORTANT! Please complete one form for each ground water source (well, wellfield, spring) used in your water system. Photocopy as necessary.

PART I: System Information

Well owner/manager : Mont Jeffreys

Water system name : Timberlake Community Club

County: Mason

Water system number: 883704 Source number: 3 SO-3

Well depth: 409 (ft.) (From WFI form)

Source name: Well # 3

WA well identification tag number: A E C-9 2 3

_____ well not tagged

Number of connections: 772 Population served: 1776

Township: 20 N Range: 02 W

Section: 18 1/4 1/4 Section: NW, SE

Latitude/longitude (if available): _____ / _____

How was lat./long. determined?

_____ global positioning device _____ survey _ _ topographic map
_____ other: _____

* Please refer to Assistance Packet for details and explanations of all questions in Parts II through V.

PART II: Well Construction and Source Information

1) Date well originally constructed: 6 / 4 / 01 month/day/year

last reconstruction: __ / __ / __ month/day/year

_____ information unavailable

2) Well driller: Charon Drilling Inc
12719 224th ST East
Graham WA 98338

_____ well driller unknown

3) Type of well:

__ Drilled: __ rotary __ bored ✓ cable (percussion) __ Dug

__ Other: __ spring(s) __ lateral collector (Ranney)

__ driven __ jetted __ other:

Additional comments: _____

_____

4) Well report available? ✓ YES (attach copy to form) __ NO

If no well log is available, please attach any other records documenting well construction; e.g. boring logs, "as built" sheets, engineering reports, well reconstruction logs.

5) Average pumping rate: 280 (gallons/min)

Source of information: Source Meter

If not documented, how was pumping rate determined? _____

_____

_____ Pumping rate unknown

6) Is this source treated?

If so, what type of treatment:

✓ disinfection ✓ filtration __ carbon filter __ air stripper __ other

Purpose of treatment (describe materials to be removed or controlled by treatment):

Iron + Manganese Removal

Hydrogen Sulfide Removal

7) If source is chlorinated, is a chlorine residual maintained: ✓ YES __ NO

Residual level: .35 - .60 (At the point closest to the source.)

PART III: **Hydrogeologic Information**

1) Depth to top of open interval: [check one]

__ < 20 ft __ 20—50 ft __ 50—100 ft __ 100—200 ft ✓ >200 ft

__ information unavailable ('<' means less than; '>' means greater than)

2) Depth to ground water (static water level):

__ < 20 ft __ 20—50 ft __ 50—100 ft ✓ >100 ft

__ flowing well/spring (artesian)

How was water level determined?

✓ well log __ other: Well Sounder

__ depth to ground water unknown

3) If source is a flowing well or spring, what is the confining pressure:

_____ psi (pounds per square inch)
or
_____ feet above wellhead

4) If source is a flowing well or spring, is there a surface impoundment, reservoir, or catchment associated with this source: __ YES __ NO

5) Wellhead elevation (height above mean sea level): 213 (ft)

How was elevation determined? __ topographic map ✓ Drilling/Well Log __ altimeter

__ other: _____

__ information unavailable

6) Confining layers: (This can be completed only for those sources with a drilling log, well log or geologic report describing subsurface conditions. Please refer to assistance package for example.)

✓ evidence of a confining layer in well log

_____ no evidence of a confining layer in well log

If there is evidence of a confining layer, is the depth to ground water more than 20 feet above the **bottom** of the **lowest confining layer**? __ YES ✓ NO

_____ information unavailable

7) Sanitary setback:

✓ < 100 ft* __ 100—120 ft __ 120—200 ft __ > 200 ft

* if less than 100 ft describe the site conditions:

See attachment from Robinson + Noble Inc.
Ground Water and Environmental Geologists

8) Wellhead construction:

✓ wellhead enclosed in a wellhouse

__ controlled access (describe): _____

__ other uses for wellhouse (describe): NONE

__ no wellhead control

9) Surface seal:

__ 18 ft

__ < 18 ft (no Department of Ecology approval) ('<' means less than)

__ < 18 ft (Approved by Ecology, include documentation) ('<' means less than)

✓ > 18 ft ('>' means greater than)

__ depth of seal unknown

__ no surface seal

10) Annual rainfall (inches per year):

__ < 10 in/yr __ 10—25 in/yr ✓ > 25 in/yr

PART IV: Mapping Your Ground Water Resource

1) Annual volume of water pumped: 23 MG (gallons)

How was this determined?

__ meter

✓ estimated: __ pumping rate (_____)

__ pump capacity (_____)

✓ other: Based on existing well 2 pumping data

2) "Calculated Fixed Radius" estimate of ground water movement:
(see Instruction Packet)

6 month ground water travel time : 280 (ft)

1 year ground water travel time : 390 (ft)

5 year ground water travel time: 880 (ft)

10 year ground water travel time: 1,240 (ft)

Information available on length of screened/open interval?

✓ YES __ NO

Length of screened/open interval: 25.7 (ft)

3) Is there a river, lake, pond, stream, or other obvious surface water body within the 6 month time of travel boundary? __ YES ✓ NO (mark and identify on map).

4) Is there a stormwater and/or wastewater facility, treatment lagoon, or holding pond located within the 6 month time of travel boundary? __ YES ✓ NO (mark and identify on map).

Comments: _____

PART V: Assessment of Water Quality

1) Regional sources of risk to ground water:

Please indicate if any of the following are present within a circular area around your water source having a radius up to and including the five year ground water travel time:

	6 month	1 year	5 year	unknown
likely pesticide application				
stormwater injection wells				
other injection wells				
abandoned ground water well				
landfills, dumps, disposal areas				
known hazardous materials clean-up site				
water system(s) with known quality problems				
population density > 1 house/acre	✓	✓	✓	
residences commonly have septic tanks	✓	✓	✓	
Wastewater treatment lagoons				
sites used for land application of waste				

Mark and identify on map any of the risks listed above which are located within the 6 month time of travel boundary? (Please include a map of the wellhead and time of travel areas with this form. Please locate and mark any of the following.)

If other recorded or potential sources of ground water contamination exist within the ten year time of travel circular zone around your water supply, please describe:

2) Source specific water quality records:

Please indicate the occurrence of any test results since 1986 that meet the following conditions: (Unless listed on assessment, MCLs are listed in assistance package.)

A. **Nitrate:** (Nitrate MCL = 10 mg/l)	YES
Results greater than MCL	
< 2 mg/liter nitrate	✓
2—5 mg/liter nitrate	
> 5 mg/liter nitrate	
Nitrate sampling records unavailable	

B. **VOCs:** (VOC detection level 0.5 ug/l or 0.0005 mg/l.)	YES
Results greater than MCL or SAL	
VOCs detected at least once	
VOCs never detected	✓
VOC sampling records unavailable	

C. **EDB/DBCP:**	YES
(EDB MCL = 0.05 ug/l or 0.00005 mg/l. DBCP MCL = 0.2 ug/l or 0.0002 mg/l.)	
EDB/DBCP detected below MCL at least once	
EDB/DBCP detected above MCL at least once	
EDB/DBCP never detected	
EDB/DBCP tests required but not yet completed	
EDB/DBCP tests not required	✓

D. <u>Other SOCs (Pesticides)</u>:	YES
Other SOCs detected (pesticides and other synthetic organic chemicals)	
Other SOC tests performed but none detected (list test methods in comments)	
Other SOC tests not performed	✓

If any SOCs in addition to EDB/DBCP were detected, please identify and date. If other SOC tests were performed, but no SOCs detected, list test methods here: _____

E. Bacterial contamination: YES

Any bacterial detection(s) in the past 3 years in samples taken from the source (not distribution sampling records). _____

Has source (in past 3 years) had a bacteriological contamination problem found in distribution samples that was attributed to the source. _____

Source sampling records for bacteria unavailable _____

Part VI: Geographic or Hydrologic Factors Contributing to a Non-Circular Zone of Contribution

The following questions will help identify those ground water systems which may not be accurately represented by the calculated fixed radius (CFR) method described in Part IV. For these sources, the CFR areas should be used as a preliminary delineation of the critical time of travel zones for that source. As a system develops its Wellhead Protection Plan for theses sources, a more detailed delineation method should be considered.

1) Is there evidence of obvious hydrologic boundaries within the 10 year time of travel zone of the CFR? (Does the largest circle extend over a stream, river, lake, up a steep hillside, and/or over a mountain or ridge?)

✓ YES __ NO

Describe with references to map produced in Part IV:

10 yr zone intersects South end of Man Made Lake. Timberlake mean depth 11 ft max depth 21 ft

2) Aquifer Material:

A) Does the drilling log, well log or other geologic/engineering reports identify that the well is located in an area where the underground conditions are identified as fractured rock and/or basalt terrain?

__ YES ✓ NO

B) Does the drilling log, well log or other geologic/engineering reports indicate that the well is located in an area where the underground conditions are primarily identified as coarse sand and gravel?

✓ YES __ NO

3) Is the source located in an aquifer with a high horizontal flow rate? (These can include sources located on flood plains of large rivers, artesian wells with high water pressure, and/or shallow flowing wells and springs.)

___ YES ✓ NO

4) Are there other high capacity wells (agricultural, municipal and/or industrial) located within the CFRs?

a) Presence of ground water extraction wells removing more than approximately 500 gal/min within...

	YES	NO	unknown
< 6 month travel time	___	✓	___
6 month—1 year travel time	___	✓	___
1—5 year travel time	___	✓	___
5—10 year travel time	___	✓	___

b) Presence of ground water recharge wells (dry wells) or heavy irrigation within...

	YES	NO	unknown
< 1 year travel time	___	✓	___
1—5 year travel time	___	✓	___
5—10 year travel time	___	✓	___

Please identify or describe additional hydrologic or geographic conditions that you believe may affect the shape of the zone of contribution for this source. Where possible, reference them to locations on the map produced in Part IV.

Suggestions and Comments

Did you attend one of the susceptibility workshops? ✓ YES ___ NO

Did you find it useful? ✓ YES ___ NO

Did you seek outside assistance to complete the assessment? ___ YES ✓ NO

This form and instruction packet are still in the process of development. Your comments, suggestions and questions will help us upgrade and improve this assessment form. If you found particular sections confusing or problematic please let us know. How could this susceptibility assessment be improved or made clearer? Did the instruction package help you find the information needed to complete the assessment? How much time did it take you to complete the form? Were you able to complete the assessment without additional/outside expertise? Do you feel the assessment was valuable as a learning experience? Any other comments or constructive criticisms you have would be appreciated.

Mason County Fire District 5
Proposed Agreed Order for Well Monitoring and Analysis at Station 5

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Please Provide Comments

The Washington Department of Ecology (Ecology) is requesting your comments on an agreed order between Ecology and Mason County Fire District 5. The agreed order requires Mason County Fire District 5 to install two groundwater monitoring wells at Station 5 and monitor levels of petroleum hydrocarbons until contamination levels are below state standards outlined in the Model Toxics Control Act (MTCA, RCW 70.105D).

Please see the right hand column for information on where to access documents and send your comments.

Site History

The site is located at East 6011 Agate Road, Shelton. On November 21, 1994, a 550-gallon gasoline underground storage tank was removed from the site. AGRA Earth & Environmental Consultants sampled the tank area for contamination when the tank was removed. Petroleum hydrocarbon contamination of the tank area soil was confirmed on December 5, 1994.

Four groundwater monitoring wells (MW-1, MW-2, MW-3, MW-4) were installed at the site in February 1995. Samples indicated the groundwater was contaminated with petroleum hydrocarbons above MTCA cleanup levels, requiring clean up of the site. The contamination was reported to Ecology on March 1, 1995.

In July 1995, approximately 1,000 cubic yards of petroleum contaminated soil was excavated and stockpiled on site for treatment by bioremediation methods. Results of samples taken from the stockpiled and treated soil in April 1997 were below MTCA cleanup levels, indicating the risk to human health and the environment were at acceptable limits. The treated soil remains at the site.

Two additional groundwater monitoring wells (MW-5, MW-6) were installed in March 1997, for a total of six monitoring wells. During sampling in July 1997, liquid phase petroleum hydrocarbons were found in monitoring well MW-2. In September 1997, petroleum contaminated soil was dug up in the vicinity of well MW-2 and stockpiled on site for bioremediation. The well was removed during the excavation.

Excavation activities in September 1999 (southwest of the initial excavation) removed approximately 800 cubic yards of petroleum contaminated soil in the area of wells MW-3 and MW-5, and stockpiled this soil on site. Similar to MW-2, wells MW-3 and MW-5 were removed during the excavation.

The excavation extended approximately 22 feet deep. An oxygen releasing compound was placed in the excavation before backfilling with clean soil to expedite cleanup of the groundwater.

September 2004 Fact Sheet

Public comments will be accepted:

March 8 through April 6, 2005

Please direct questions and written comments to:

Carol Johnston
WA Dept. of Ecology
SWRO Toxics Cleanup Program
PO Box 47775
Olympia, WA 98504-7775
cjoh461@ecy.wa.gov, or call (360)407-6263

Documents are available for your review at:

William G. Reed Library
710 W Alder Street
Shelton, WA
(360) 426-1362

WA State Dept. of Ecology
SWRO Toxics Cleanup Program
300 Desmond Dr.
PO Box 47775
Olympia, WA 98504-7775
(360)407-6365
sfle461@ecy.wa.gov

Web sites
www.ecy.wa.gov/programs/tcp/sites/MasonCountyFD5/mcfd5_hp.html

www.ecy.wa.gov, then click on "Public Events Calendar"

printed on recycled paper

Ecology Publication Number 05-09-037
If you have special accommodation needs or require this document in an alternative format, please call Cedar Bouta at (360) 407-6245. For TTY, please call 711 or 1-800-833-6388.

In May 2000, sampling of the three remaining monitoring wells was attempted. MW-1 could not be located and MW-4 was found to be inadequate for sampling. MW-6, the monitoring well located up-gradient from the former tank location, was the only well suitable for sampling. Samples collected from MW-6 and analyzed in May 2001 indicated no petroleum hydrocarbons, benzene, toluene, ethyl benzene, or xylene contamination above MTCA cleanup levels.

In April 2003, MW-6 could not be located and two new groundwater monitoring wells were installed. The two new wells were sampled in May 2003. MW-1A was found to contain petroleum hydrocarbons and benzene above MTCA cleanup levels. Total petroleum hydrocarbons, benzene, toluene, ethyl benzene, and xylenes were not detected in samples from MW-4A.

The extent and magnitude of groundwater contamination down-gradient from the former tank location is still unknown at this time.

Next Steps

Exhibit B of the agreed order is a draft work plan. The draft work plan outlines the next steps to be taken by Mason County Fire District 5. Key steps are:

- Review and analyze well records of wells within one-half mile of the fire station to determine potential contaminant migration.
- Install one or two groundwater monitoring wells down gradient from the former tank location.
- Sample soil for chemical analysis during well installation.
- Sample four or five groundwater monitoring wells (three existing and one or two new) until such time as four consecutive quarters of results below MTCA cleanup levels are obtained.
- Place an oxygen releasing compound in monitoring wells if needed.
- Prepare reports for each activity performed at the site.

Ecology Wants Your Comments

You are invited to submit comments on the draft agreed order March 4 through April 4, 2005. Please see the front of this fact sheet for details on where you can access documents and where to submit your comments.

Location Map

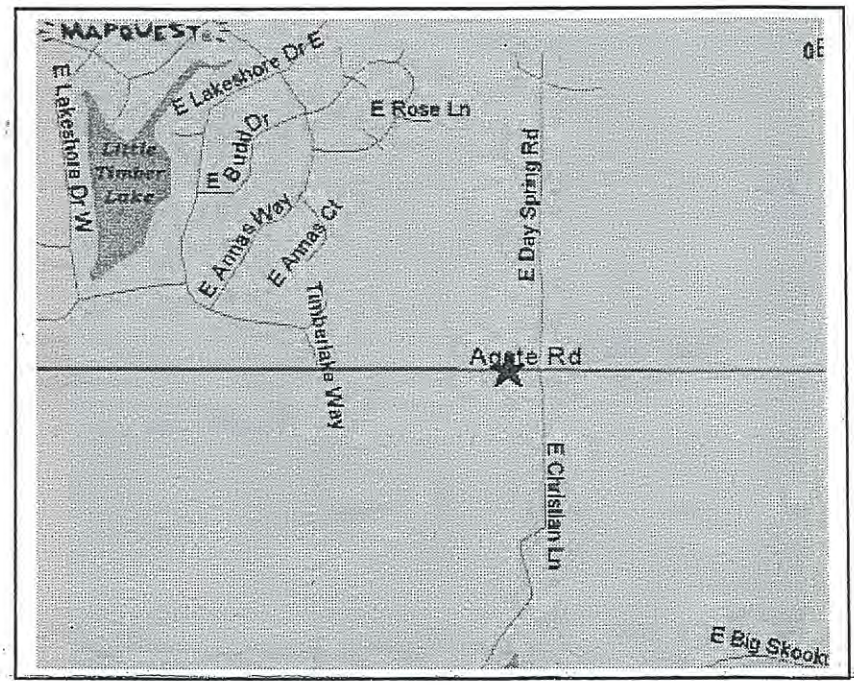
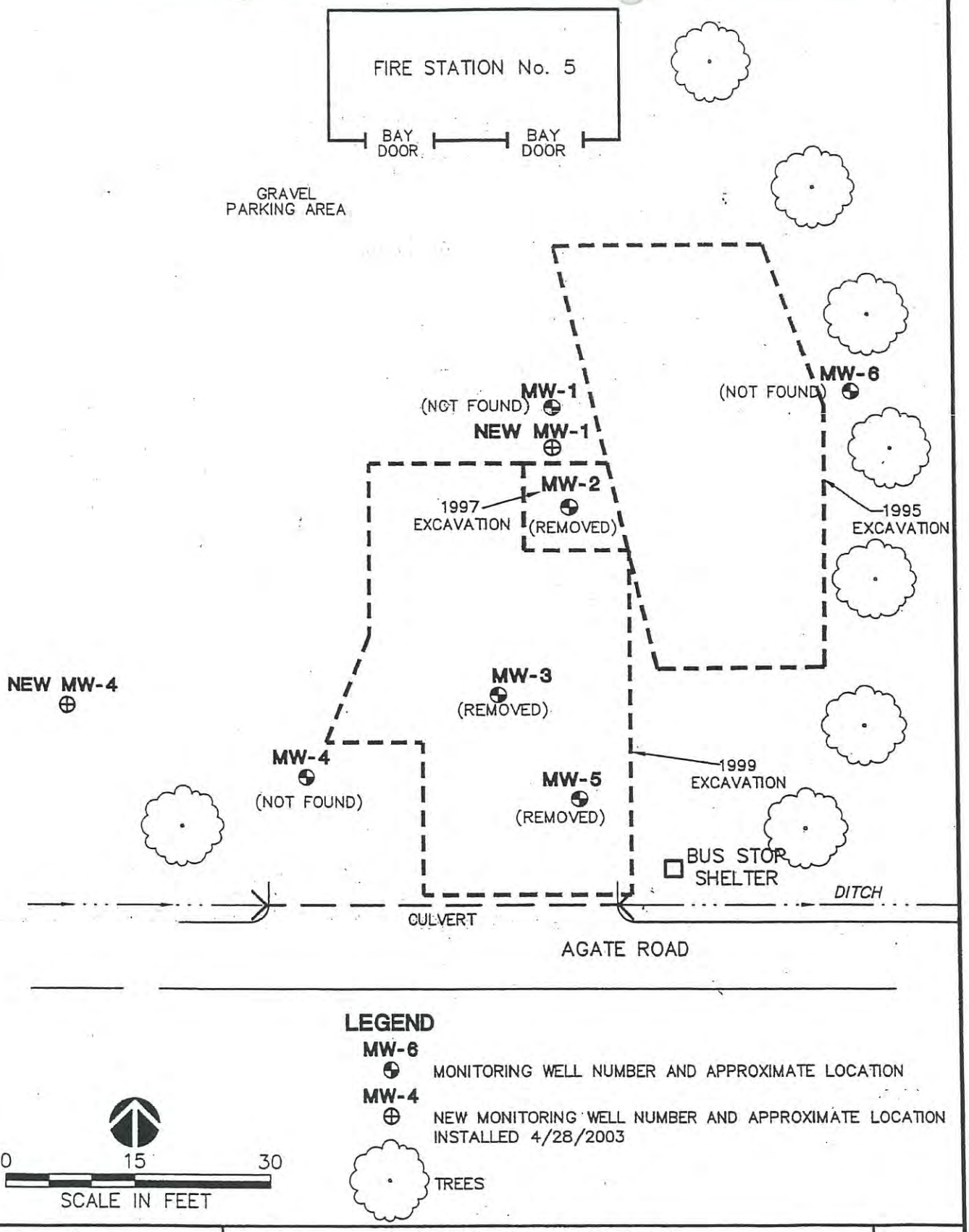


EXHIBIT A-2



JOB NO.: 03-91M-14681-0 | DWG DATE: 05-20-2003 | SCALE: 1"=15' | DESIGN BY: EMM | FILE NAME: FIG-2.DWG

amec
AMEC EARTH AND ENVIRONMENTAL, INC.
11335 N.E. 122nd Way, Suite 100
Kirkland, WA, U.S.A. 98034-6918

SCHEMATIC SITE PLAN

MASON COUNTY FIRE STATION NO. 5

SHELTON, WASHINGTON

FIGURE 2

Section 11. Alternative Water Sources

There are no Group A systems within 10 miles capable of supplying water to the community.

Alternate source(s) of water

ALTERNATIVE SOURCES	NAMES	PHONE	AVAILABILITY	IS THE WATER SAFE FOR DRINKING?
Bottled Water	Walmart	360-427-6226	Up to 1000 gallons in one gallon jugs in 2 hours. 350 gallons per pallet can be ordered and available in 48 hours.	Yes
Bottled Water	Mason County Emergency Management	360-427-7535	Up to 1000 gallons in 1 gallon jugs in 2 hours	Yes
Tanker	Mason County Fire District #5	360-426-5533	5,000 gallons in one hour	No
Lake Water – Timberlake lakes	On-site		Unlimited amount	No – must be boiled and/or disinfected for drinking and cooking purposes

Responder notification was mailed to the following departments on September 14, 2012.

Central Mason Fire and EMS
Attn: Chief McKern
P.O.Box 1910
Shelton, Wa 98584

Mason County Emergency Management
Attn: Terri Wright
100 W Public Works Drive
Shelton, Wa. 98584

Mason County Health Dept
P.O. Box 1666
Shelton, Wa 98584

TIMBERLAKE COMMUNITY CLUB
2880 East Timberlake West Drive
Shelton, WA 98584-7936
Phone: 360-427-8928 ~ Fax: 360-427-1755
~Pride in Ownership~

September 14, 2012

Letter of Notification: Timberlake Community Club Wellhead Protection Plan

Dear Emergency Responder:

Timberlake Community Club is updating it's a wellhead protection plan as required by the State Department of Health. As part of this plan, our water system must coordinate with agencies responsible for incident/spill response procedures. Using the results of the susceptibility assessment and the findings of the wellhead protection area inventory, local emergency responders are asked to evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within wellhead protection areas. As stated in the Wellhead Protection Program Guidance Document, "If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans."

The susceptibility assessment and a map of the wellhead protection areas with potential contaminant sources are enclosed for your review. An acknowledgement of receipt of this information and/or a response from your office would be appreciated at timberlakewater@hctc.com.

Thank you for your attention in this matter. If you have any questions about the plan, please fell free to contact me.

Sincerely,

Arthur Bushey

Arthur Bushey, WDM2/CCS
Water System Operator

CHAPTER 5

SOURCE PROTECTION

This chapter is intended to develop a program to protect and improve the source water utilized by the Community. Any facilities and activities within the zone of contribution to the source wells, which may adversely impact the quality of the Community's source water, must be identified, monitored, limited and controlled to the greatest extent possible. Because the Community's sources include only groundwater wells, a surface water watershed protection program is not required. However, a wellhead protection program is required.

5.1 WELLHEAD PROTECTION PROGRAM

The Timberlake Community has not currently completed all the steps to implement the Community's wellhead protection program. The appropriate susceptibility assessments have been performed for all wells. The Community must still complete the contaminant source inventories for all wells. In addition, the Community must notify residents within the wellhead protection areas and local agencies regarding the formation of thorough contingency and spill response plans. These tasks will be highlighted as priority items requiring immediate attention and will be completed in a timely fashion.

5.1.1 Overview

The intent of the wellhead protection program is to reduce the potential risk for contamination of groundwater within the wellhead protection area. The components of wellhead protection outline individual programs for notifying potential contaminate sources, education and implementation of actions to protect groundwater supply and the creation of locally defined spill response procedures for spill incidents within the wellhead protection area. Once complete, the Community will coordinate the implementation of this plan with the local jurisdictions including the Mason County Health Department. The responsibility for administering the Wellhead Protection Program will be added to the responsibilities of the Timberlake Community.

5.1.2 Completed Susceptibility Assessment

Groundwater Contamination Susceptibility Assessment Survey forms for all three wells have been filed with the Department of Health as of July, 2007. See Appendix H for these forms.

5.1.3 *Delineated Wellhead Protection Area*

A wellhead protection area is defined as the surface and subsurface area surrounding a well that is used as a public water supply. It is within this area that contaminants are likely to pass and could eventually reach the water in the wells. The delineated areas for the Community's wells are provided in the illustrations located at the end of this Chapter.

If a spill of hazardous materials occurred in the protection area of a well, it could pose a direct risk to the drinking water supply for the Community. The method used to delineate the wellhead protection zones is the calculated fixed radius method. This method is part of the basic Washington State susceptibility assessment form. Utilizing this form, the calculated fixed radii were determined for the 6-month, 1-year, 5-year and 10-year time of travel for contaminants. The following table illustrates the size of the related zones of contribution for each of the Community's well in relation to the established travel times

TABLE 5.1
TIMBERLAKE COMMUNITY CLUB
Zone of Contribution for Wells (ft.)

	Well	*6 month*	*1 year*	*5 year*	*10 year*
Zone of Contribution for CWD Wells, radius in ft.	1	200	280	620	880
	2	700	980	2,200	3,110
	3	280	390	880	1,240

The Table 5.1 above illustrates the distance a contaminant may travel through the substrate around a particular well for a given period of time. For example, it's projected that it would take one year for a contaminant that was spilled 980 feet from Well #2 to reach the well.

There are potential contaminant sources that exist within the calculated wellhead protection zones for all of the Community's wells. These potential contaminant sources include:

- Potential residential on-site sewage disposal systems
- Potential agriculture activities such as pesticides from residential use
- Potential vehicular traffic-related spills
- Potential operations at Mason County Fire District 5, Station 5

- Potential activities effecting the Community's lakes

The possibility also exists for contamination from additional sources, which are unknown at this time. However, the limited development of the wellhead areas suggests that contamination should be minimal to non-existent. Figures 5.1 through 5.3, located at the end of this chapter, illustrate these areas in relation to the Community's boundaries.

5.1.4 *Inventory of Potential Sources of Contamination*

The purpose of creating an inventory of all potential sources of groundwater contamination in and around the wellhead protection areas is to identify past, present and proposed activities that may pose a threat to the aquifer utilized by the wells. The sources of available information include the State databases and personal historical knowledge of the area. Prior to the development of the Timberlake community, the area was generally forestland. There is little possibility of historical contamination points, unless a small amount of contamination occurred during construction of the community.

The Washington State Department of Ecology (DOE) tracks and monitors sites registered as toxic cleanup sites. In regard to the area surrounding the Community, DOE recognizes the Mason County Fire District 5, Station #5, as the only registered underground storage tank within one mile of the Water System see Appendix H. This facility is also the only business allowed in the wellhead protection area per the covenants of the Community.

5.1.5 *Notification of Findings*

Upon completion of the documents, the Timberlake Community will notify State and local agencies of the wellhead protection program's findings including the wellhead protection boundaries. They will also notify residents and customers within the contribution zone radii with a letter discussing the risks to groundwater and actions to be taken in case of a spill or accidental contamination. The letter will include a list of precautions they can take to minimize impacts from on-site sewage disposal systems.

5.1.6 *Contingency Plans*

In the event of a ground water source contamination event, the affected well or wells would be shut down and the Community would rely on the other sources for service if possible. Since all of the Community's wells are within 800 feet of each other, all wells would be closely monitored for contamination. Depending on the location of the contamination, the level of effort required to provide service from remaining the wells could range from a very simple to a labor-intensive operation.

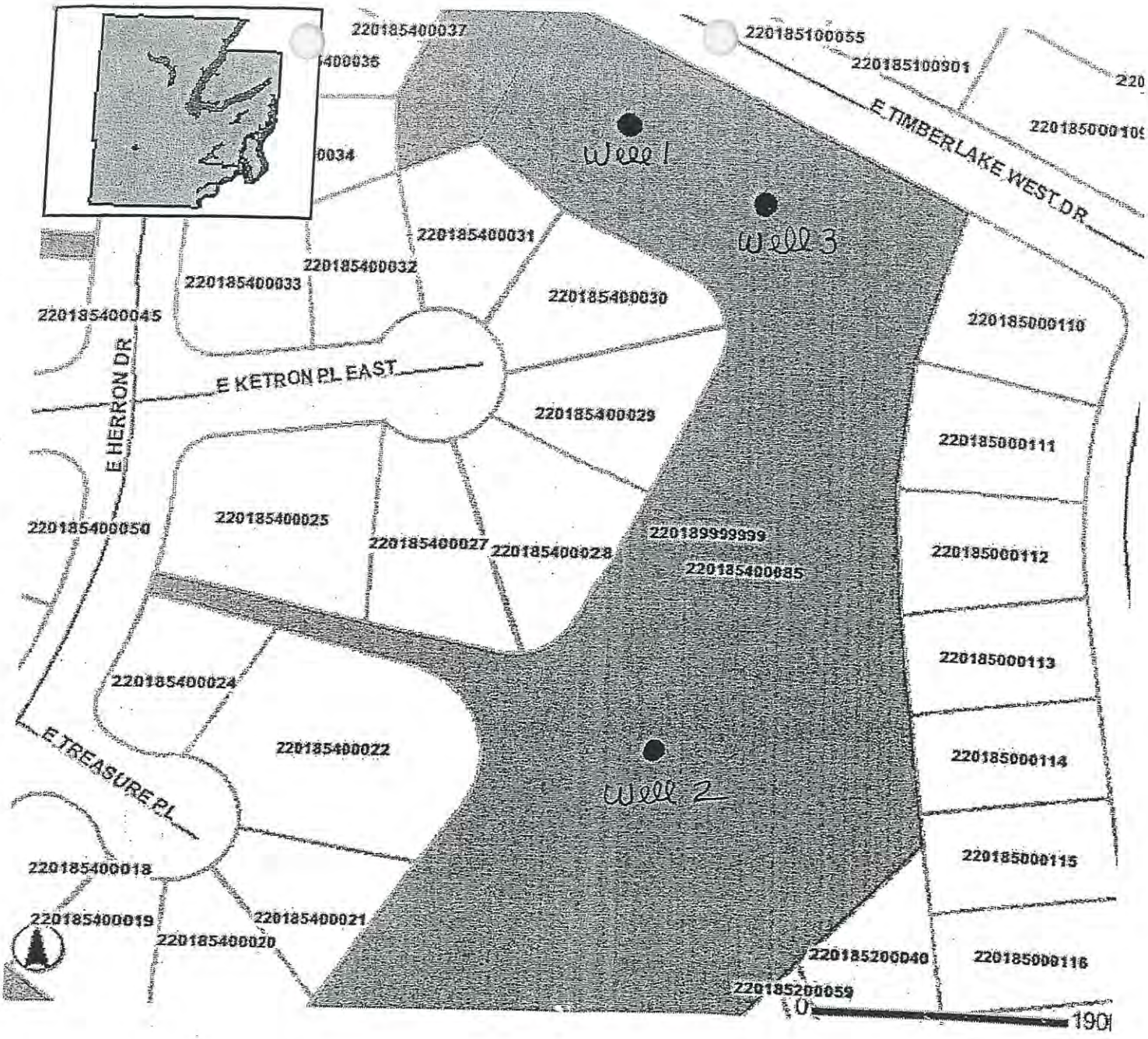
Once the contamination is detected, the Community would isolate the affected well or wells and any contaminated portions of the distribution system. The Community would then disinfect, flush and test the distribution system in order to restore service to these areas. Once service has been restored, the Community would concentrate on restoring the affected wells if possible.

Should the well be contaminated beyond the point of being used, the Community would evaluate the use of the other wells as the primary point of withdrawal. Since the wells are in such close proximity to each other there is a strong possibility the other wells could become contaminated. The alternative to utilizing the remaining wells is the construction of a new well at another location.

This is a feasible concept considering the Community owns various other parcels of land within the service area. However. Drilling a new well would take time and the costs are estimated to be close to $150,000.

5.1.7 *Spill / Incident Response Measure*

The local Fire District, the Mason County Health Department and the County Emergency Services Departments will be informed of the wellhead protection area boundaries. Procedures for response to a spill incident within the wellhead protection area will be developed by the local emergency service organizations.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Well 1
well 3
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220185000110
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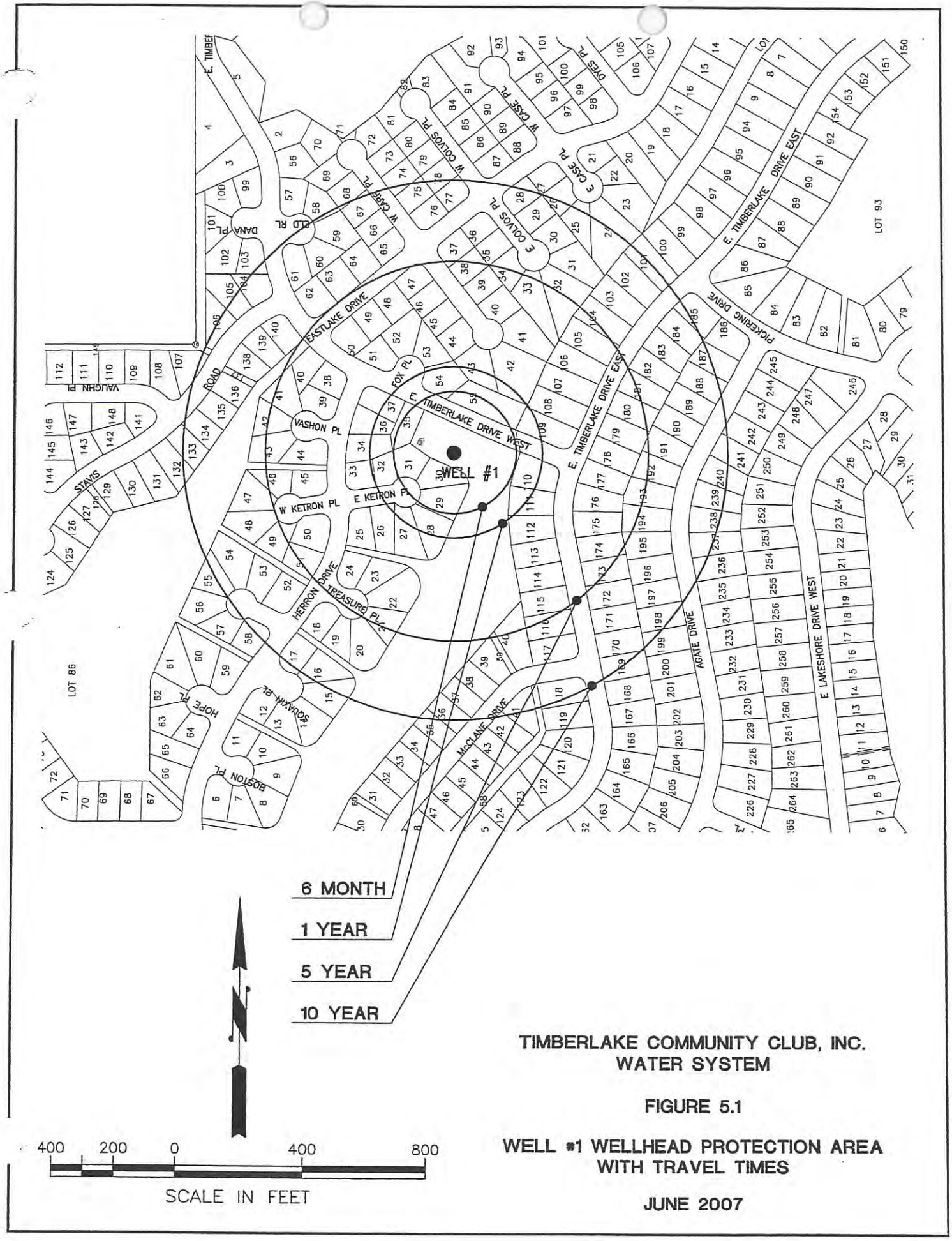
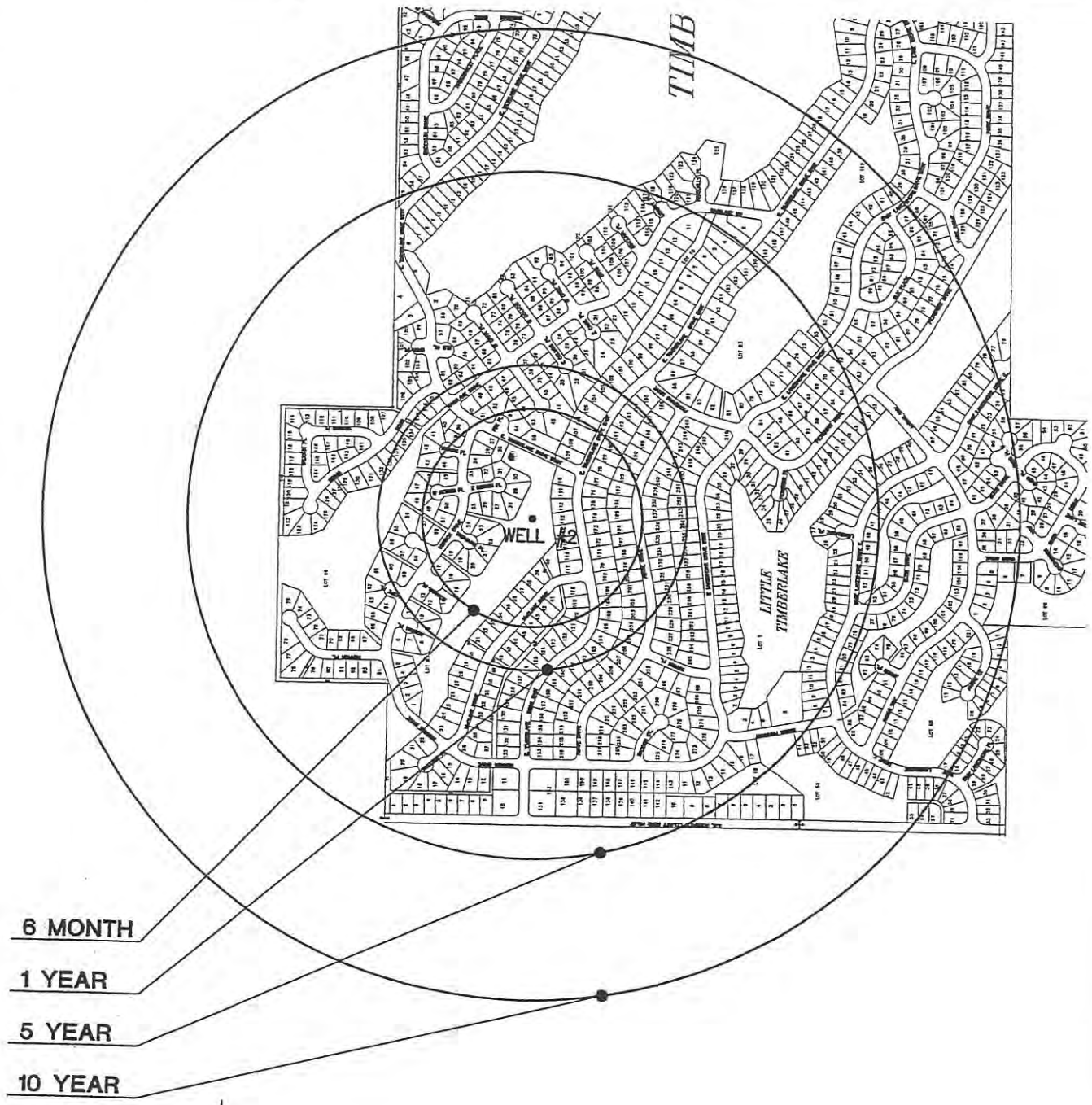


TIMBERLAKE COMMUNITY CLUB, INC.
WATER SYSTEM

FIGURE 5.1

WELL #1 WELLHEAD PROTECTION AREA WITH TRAVEL TIMES

JUNE 2007



,000 500 0 1000 2000

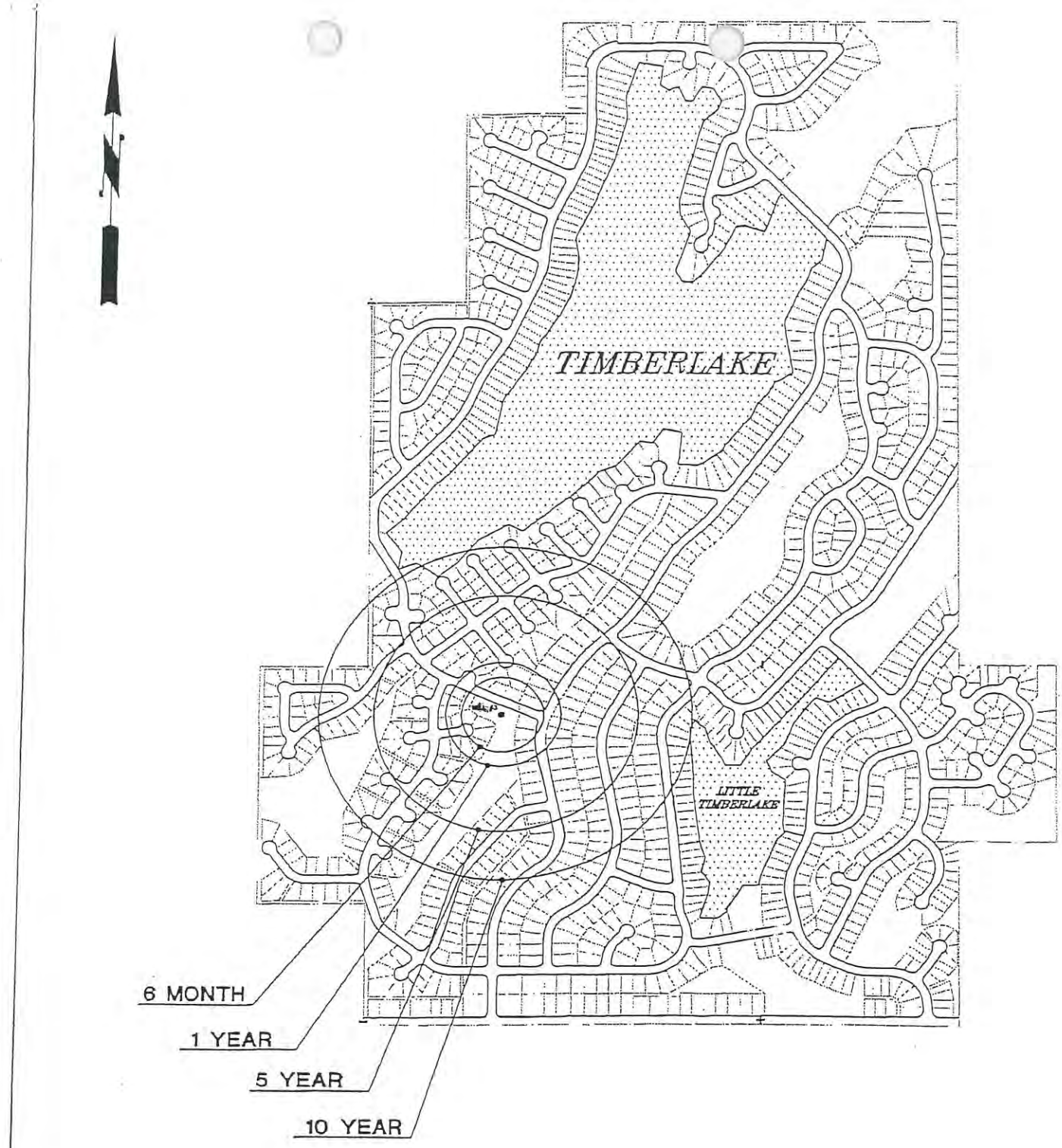
SCALE IN FEET

TIMBERLAKE COMMUNITY CLUB, INC.
WATER SYSTEM

FIGURE 5.2

WELL #2 WELLHEAD PROTECTION AREA WITH TRAVEL TIMES

JUNE 2007



TIMBERLAKES COMMUNITY CLUB, INC.
WATER SYSTEM

WELL #3 WELLHEAD PROTECTION AREA
WITH TRAVEL TIMES

MAY 2005

TIMBERLAKE COMMUNITY CLUB
2880 East Timberlake West Drive
Shelton, WA 98584-7936
Phone: 360-427-8928 ~ Fax: 360-427-1755
~Pride in Ownership~

September 14, 2012

Letter of Notification: Timberlake Community Club Wellhead Protection Plan

Dear Emergency Responder:

Timberlake Community Club is updating it's a wellhead protection plan as required by the State Department of Health. As part of this plan, our water system must coordinate with agencies responsible for incident/spill response procedures. Using the results of the susceptibility assessment and the findings of the wellhead protection area inventory, local emergency responders are asked to evaluate whether changes in incident/spill response procedures are needed to better protect groundwater within wellhead protection areas. As stated in the Wellhead Protection Program Guidance Document, "If a public water system's source water is determined to be vulnerable to surface activities, special procedures may need to be incorporated into local emergency response plans."

The susceptibility assessment and a map of the wellhead protection areas with potential contaminant sources are enclosed for your review. An acknowledgement of receipt of this information and/or a response from your office would be appreciated at timberlakewater@hctc.com.

Thank you for your attention in this matter. If you have any questions about the plan, please fell free to contact me.

Sincerely,

Arthur Bushey

Arthur Bushey, WDM2/CCS
Water System Operator

timberlakewater@hctc.com

From: Tammi Wright <TammiW@co.mason.wa.us>
Sent: Tuesday, October 16, 2012 1:16 PM
To: timberlakewater@hctc.com
Subject: Timberlake Community Club Wellhead Protection Plan

Art,
This email is confirmation that Mason County Division of Emergency Management has received a copy of the Timberlake Community Club Wellhead Protection Plan. We are keeping the copy on file for future reference as needed. Thank you for submitting a copy to us.

Tammi Wright
Senior Emergency Management Coordinator
Mason County Division of Emergency Management
100 W. Public Works Dr.
Shelton, WA 98584

phone: (360) 427-9670 x800
fax: (360) 427-7756
email: tammiw@co.mason.wa.us

TIMBERLAKE COMMUNITY CLUB
2880 East Timberlake West Drive
Shelton, WA 98584-7936
Phone: 360-427-8928 ~ Fax: 360-427-1755
~Pride in Ownership~

September 14, 2012

Letter of Notification: Timberlake Community Club Wellhead Protection Plan

Dear Resident:

The Timberlake Community Club water system is updating its a wellhead protection plan as required by the State Department of Health. Wellhead protection involves protecting the land area surrounding our wells in order to prevent contamination of the drinking water supply. Part of the plan is a letter of notification to all potential sources of contamination to our wells. The majority of our community's residents live within the wellhead protection areas surrounding our wells (see map on other side).

This letter is an attempt to inform you of the locations of our wells and protection zones and to serve as a reminder that hazardous materials put onto the ground (or into septic systems) has the potential of contaminating our drinking water supply. Some examples of household hazardous materials are:

- Paint, paint thinner and other solvents.
- Motor oil, gasoline, antifreeze or similar automotive fluids. These materials can be recycled, **free of charge**, at most major auto shops and parts stores.
- Fertilizers and pesticides.
- Household cleaners, bleach, and furniture polish.

These materials should only be used according to label directions. Any unwanted or unused household hazardous materials can be disposed of free of charge at:

HOUSEHOLD HAZARDOUS WASTE DISPOSAL
Mason County Transfer Station
West 501 Eells Hill Road
Shelton, Washington 98584
360-427-5271

We are fortunate to have a very good supply of drinking water. It should be everyone's intent to keep it that way for our continued good use, and for the ones that come along after us. Thank you for following these guidelines. If you have any questions about this matter, please feel free to contact me.

Sincerely,

Arthur Bushey

Arthur Bushey, WDM2/CCS
Water System Operator

TIPS TO AVOID SEPTIC SYSTEM TROUBLE:

DO!!!:

- **Take leftover household chemicals to a hazardous waste collection center for disposal.**
- **Practice water conservation. Repair dripping faucets and leaking toilets, run dishwashers and washing machines only when full.**
- **Learn the location of your septic system and drainfield.**

DON'T!!!:

- **Allow anyone to drive or park over any part of the system. Areas should be left undisturbed with only a mowed grass cover. Roots from nearby trees or shrubs may clog and damage your drain lines.**
- **Use commercial septic tank additives. These products usually do not help and some may hurt your system in the long run.**
- **Poison your system by pouring chemicals down the drain. They can kill the beneficial bacteria that treat your wastewater.**

Well Head Protection Notices to be sent to residences within the 10 year area of travel

Division 1
1/81 thru 1/88
1/96 thru 1/125
1/161 thru 1/205
1/229 thru 1/259

Division 3
3/18 thru 3/98

Division 4
4/30 thru 4/48

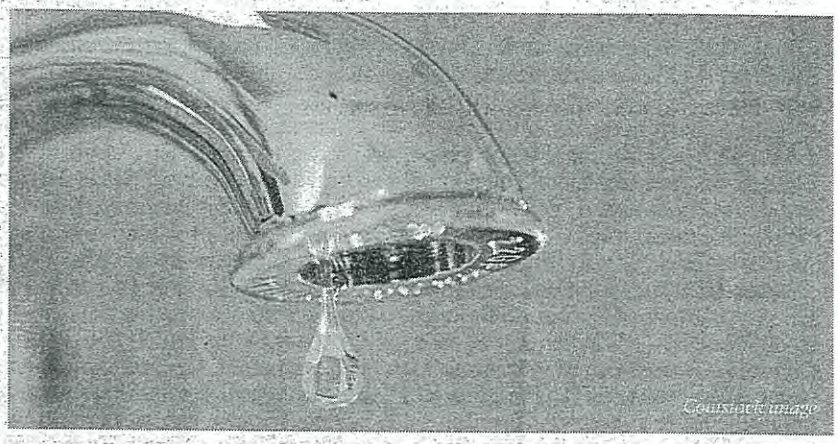
Division 5
5/99 thru 5/140

Division 6
6/09 thru 6/61

You can help keep our drinking water safe

Water is such an important part of living here in the Northwest, whether it is falling from the sky, ebbing with the tide, or flowing from an artesian well in downtownOlympia. While most of us do not think a lot about water that flows out of faucets in our homes, a safe supply of drinking water is critical to good health.

DR. DIANA T. YU
Health Matters



If your tap water comes from a public water supply, the provider is required to do regular testing to assure the drinking water is safe. Our region's water performs very well. Ask your water provider if you want to see the water testing results.

In Thurston County, most of our drinking water comes from ground water. Biological and chemical contaminants can seep into the ground and affect our drinking water supply, so we all can do our part to protect the water that we drink with a few simple steps:

- **Be selective** about the household products you purchase and use in your home, garage, shed, or yard. Choose less hazardous products that do not have any of these words on the label: poison, danger, warning, or caution.
- **Get your car** washed and oil changed at a business that follows environmentally sound practices.
- **Bring unwanted** household cleaners and other hazardous products to be disposed of free to HazoHouse (8 a.m. to 5 p.m. Fridays through Tuesdays) at the Thurston County Waste and Recovery Center on Hogum Bay Road off Interstate 5 Exit 111 in Lacey.

If your water comes directly from a private well, then the above recommendations are especially important. Since many contaminants have no obvious odor, taste, or color, how can you tell if any are in your private well water? You can have your water tested for biological contaminants (coliform bacteria) and nitrate at the Thurston County Environmental Health Laboratory ($25 per test) or any other accredited laboratory. For other chemical testing, go to co.thurston.wa.us/health/ehdw to find a list of accredited laboratories.

Thurston County recommends testing private wells at least once a year for coliform and every three years for nitrate. In areas known to have high levels of nitrates in the ground water, test for nitrates more frequently. Contact the health department with questions.

You also should test your well if a household member has an unexplained illness; a neighbor's well is contaminated or has a failing septic system; there is a noticeable change in the water's appearance, taste or smell; your water system is repaired or replaced; or when there has been flooding near your well.

Sample containers must be obtained from the laboratory and it is very important to read the accompanying sampling instructions. Generally, samples must be delivered to the lab the same day they are collected. For Thurston County's lab, sample containers are available at several locations: County Courthouse Building 1, 2000 Lakeridge Drive S.W.; Public Health Building, 412 Lilly Road N.E.; city hall buildings in Rainier, Yelm and Tenino; and at the Rochester ROOF Community Center.

Testing and protecting our water supplies can help ensure safe drinking water for all of us. For more information about drinking water safety, locating an approved laboratory, or testing your private well water, go to co.thurston.wa.us/health/ehdw or call 360-867-2673.

Dr. Diana T. Yu is the Health Officer for Thurston and Mason counties. Reach her at 360-867-2501 or yud@co.thurston.wa.us.

ON THE WEB

Read past columns from health officer Dr. Diana T. Yu. Go to **www.theolympian.com/healthmattters.**

Public Information on septic systems and hazardous wastes for the well head protection areas are made available through mailings and also handouts at the Timberlake Community Club Multi-Purpose Center.

Septic Systems

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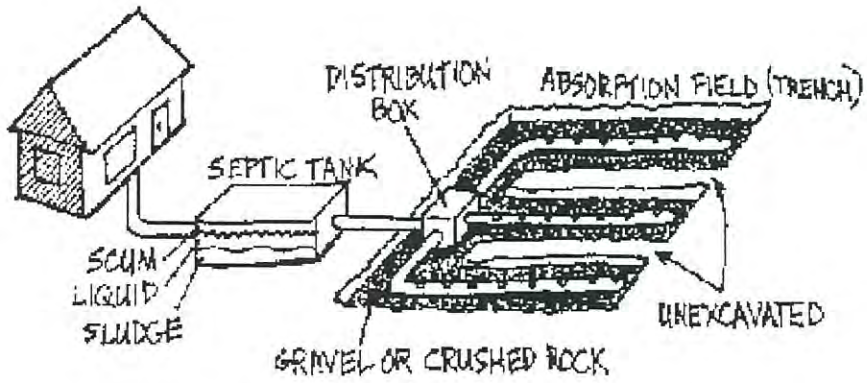
An on-site septic (sewage) system is the most common method of sewage treatment and disposal for homes that are not on a public sewer line. A septic system consists of a tank and a drainfield where the wastewater slowly seeps into the soil. Proper septic systems treat the sewage before it reaches ground and surface waters. Poorly designed or malfunctioning systems cause odor and water pollution.

Design

A licensed designer must be consulted about new or upgraded systems. Your county health department must inspect it before you cover it. This is the law.

Be sure you know how your system works. Many newer homes have "alternative" systems with electric pumps and controls which require annual inspection by a professional. The state Department of Health has information about the different types of systems and their maintenance.

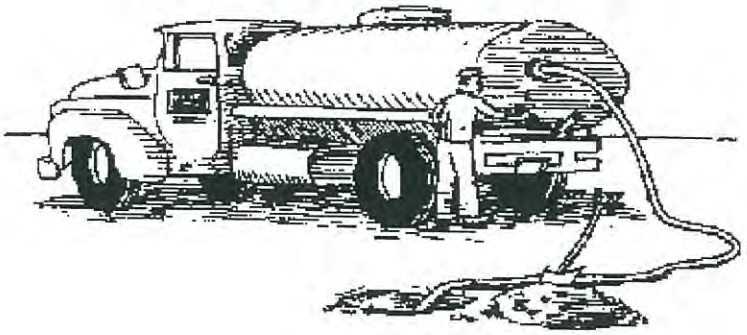


ONE TYPE OF ON-SITE SYSTEM

Maintenance

Septic tanks need to be inspected by a knowledgeable person once a year. Frequency of pumping will depend on your household habits.

- Do not flush material that will not easily decompose, such as hair, diapers, cigarette butts, sanitary napkins, tampons, or coffee grounds. They will reduce your system's capacity and clog the drainfield.
- If you use a garbage disposal, it will contribute to the wasteload of your on-site system and you must allow for more frequent inspection.
- Do not wash or flush strong chemicals into the system. They kill the bacteria needed to decompose the wastes.
- Reduce the volume of wastewater by installing water-saving devices and thinking conservation year-round, not just during drought.
- Balance water use throughout the week to avoid overloading the system at any one time.



- Don't let the soils over the drainfield get compacted. Do not use that area for large animals, a roadway, parking spot, patio, or as a storage area.
- Do not cover the surface of the drainfield with anything impermeable like plastic or cement. This reduces the soil's ability to "breathe," preventing proper function of the drainfield.
- Divert roof drains and runoff away from the drainfield. Saturated soil cannot absorb wastewater from the septic system.
- Do not drain hot tub water to septic systems or surface water; the large amount of chlorinated water would be harmful. Regulations vary, so please check with your local health department for disposal options in your community.
- Keep accurate records, including diagrams of design, location and size of the entire septic system. They should include dates the system was inspected and when the tank was pumped (a record page is included in this guide).

Signs of Septic System Failure

- Ponded water or damp spots, foul odors, and/or dark gray or black soils in your yard
- Water that rises to the surface during heavy rain or when your water use is high, such as when doing laundry
- Toilets that flush slowly or drains that back up
- Patterns of bright lush growth in your lawn, or the growth of plants associated with swampy areas.

If you notice any of the above signs or have any suspicions that your system may have problems, get it checked right away. Septic systems do not generally show signs of failure until they are in an advanced state of deterioration. You can avoid costly repairs by having your tank inspected and pumped regularly.

For information and help: Contact your county environmental health department or the state Department of Health.

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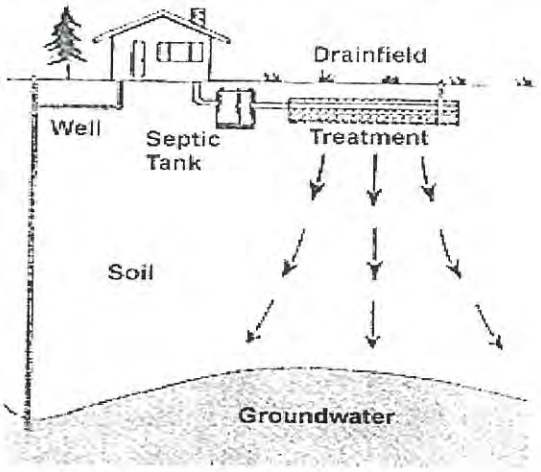
Septic Sense

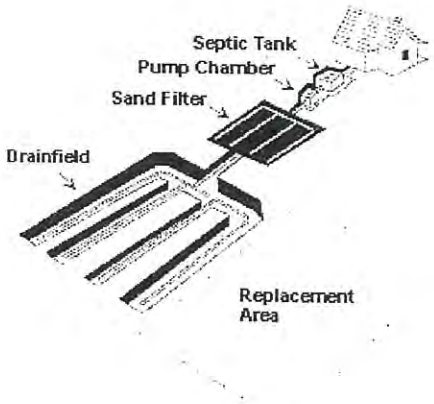


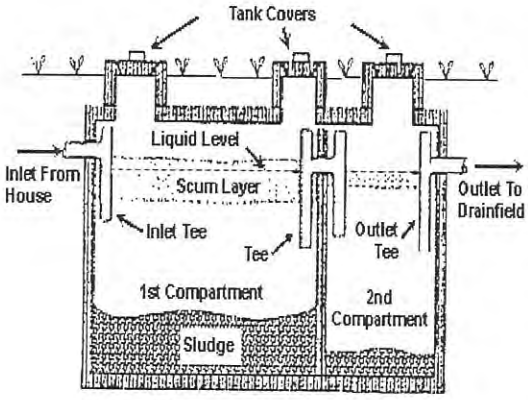
LEARN HOW TO....

- **Prolong the life of your septic system**
- **Protect water quality**
- **Save money**

Your Septic System: The Basics

A standard septic system consists of a septic tank, a drainfield, and a replacement area for the drainfield. Your system may also have a pump chamber between the septic tank and the drainfield.





The Septic Tank

The wastewater from all your household plumbing flows into the septic tank. Solid material settles to the bottom forming the sludge layer, and lighter material floats to the top, forming a scum layer. Naturally occurring bacteria break down the wastes into digested sludge and gases. A clear zone forms in the middle.

Many septic tanks have two compartments. Sludge and scum slowly build up in both compartments and need to be pumped out.

Regular pumping can help prevent the escape of sludge and scum into the drainfield. Sludge and scum can clog the drainfield and cause it to fail.

Most septic tanks need to be pumped every three to five years. Don't wait for a problem—get your tank pumped on a regular schedule! The schedule for your tank will depend on the tank size, amount of water you use, and the type of use it gets. Take the guesswork out of it; hire a septic system professional or inspect the tank yourself.

The Drainfield

As wastewater enters the septic tank from the house, partially treated wastewater is pushed from the tank out into the drainfield. The drainfield is a series of pipes with holes set in a bed of gravel. The wastewater trickles or is pumped through the pipes and trickles through the gravel into the soil. The size and type of drainfield depend on the number of bedrooms in your home and soil conditions. The soil is a very important part of the treatment process. It acts as a natural filter and contains organisms that further treat the wastewater.

If too much wastewater enters the septic tank in a short period of time, the wastewater flows out of the tank before it has had time to settle, forcing solids into the drainfield or pump chamber. To keep this from happening, spread high-volume water use, such as laundry, throughout the week. All homes should have a replacement area where a new drainfield could be installed if the original one becomes unusable. Be careful not to build or plant trees on the drainfield or the replacement area. Do not cover or pave over the drainfield with things like basketball courts, patios, or hot tubs.

Pumps And Pump Tanks

A pump regulates the flow of wastewater to the drainfield. Inspect pumps at least every year to ensure all parts are in working order. Pump tanks should be inspected and cleaned on a regular maintenance schedule.

Alternative Systems

Homes built on sites that do not have adequate soils may require specialized system components such as a mound, sand filter or other alternative or proprietary device. These systems require regular maintenance by trained maintenance specialists.

SIGNS OF FAILURE

Watch for these warning signs that something is wrong. If you notice any one of these signs, call a septic professional. A simple repair done soon can prevent more costly repairs.

- Odors, surfacing sewage
- Wet spots in the drainfield
- Plumbing back-ups
- Slow-draining fixtures
- Gurgling sounds in the plumbing

Frequently Asked Questions

How do I know when to pump?

The rule of thumb is to get your tank pumped every three to five years. If you just moved in, you may want to inspect in two or three years. You can inspect the tank yourself, or hire a professional. Call the Mason County Department of Health Services to get instructions on inspecting the tank or for a list of certified pumpers and maintenance specialists. When you get your tank pumped, the pumper will give you a copy of the report and recommend a pumping schedule.

What can I plant on my drainfield?

The best plants over a drainfield are shallow-rooted ground covers, such as grass and wildflowers. Keep trees at least 30 feet from the drainfield. For a list of appropriate plants, ask for the "*Landscaping Your Drainfield*" brochure.

What can I use to unclog my drains?

First, prevent clogs by using drain traps to keep hair and food from going down the drain. If drains get sluggish, try pouring ¼ cup vinegar down the drain, then wash down with boiling water. For more stubborn clogs, try a plumber's snake or plunger. Use chemical drain openers as a last resort, and do not use more than one dose.

How can I find the location of my septic system?

Call Mason County Environmental Health at (360) 427-9670. Ext. 352. Ask if construction documents ("as-builts") are available for your septic system. For the quickest response, provide your 12-digit parcel number.

Is it okay to use an additive, such as yeast or a commercial product?

Additives are not needed for proper septic system functioning. Don't be fooled by ads for miracle cleaners that claim "you will never have to pump again!" Some chemical "cleaners" can destroy your drainfield; others contain harmful chemicals that can pollute water. Pumping your tank regularly is the single most important thing you can do.

Does it matter whether I use a liquid or powdered detergent?

Bulk, economy-size powders may have fillers that can clog the septic tank inlet. Most pumpers and maintenance specialists recommend liquid cleaners.

TIPS FOR SUCCESS

Conserve to preserve

Conserve water to extend the life of your septic system. Cut your water use in half by installing low flush toilets and water-saving fixtures in faucets and showerheads. Spread out big water uses, like laundry and showers.

Rise above it all

To make it easier to inspect and pump your tank, the next time you have it dug up, install risers on the tank. They make it easier to find your tank opening and save the time or expense of digging.

Watch what goes down the drain

Keep grease, food scraps, and coffee grounds from going down the drain. Put plastics, personal hygiene products, paper towels, and kitty litter in the garbage; not down the toilet.

Don't drown the drainfield

Divert roof drains, surface water, and sump pumps away from the drainfield. If it gets saturated, the drainfield loses its ability to remove pollutants from wastewater.

Questions or requests for more information about your on-site septic system?

Call us...

Environmental Health
(360) 427-9670 Ext. 352

Mason County Department of Health Services
426 W Cedar, PO Box 1666, Shelton, WA 98584
Shelton (360) 427-9670 Ext. 352
Belfair (360) 275-4467 Ext. 352
Elma (360) 482-5269 Ext. 352
www.co.mason.wa.us

Always working for a safer and healthier Mason County

Timberlake Community Club

Water System

Operations and Maintenance Manual

Recommended Preventive Maintenance

Daily
Weekly
Monthly
Quarterly
Biannually
Annually

Daily

Check water meter readings and record water production. The water system should have a working, properly calibrated master water meter to accurately monitor usage. Take routine source water meter readings and record them in a log. Calculate the amount of water used during a time period, usually daily or weekly, by subtracting the previous meter reading from the current meter reading. Knowing the water use of your water system throughout the year provides information that can be used to evaluate source capacity, water rights, unusually high or low flows, excessive leakage, reduced pump output, unauthorized water use and the adequacy of the treatment system capacity. If your customers have meters, they should be read either on a monthly basis or with your billing cycle, totaled, and compared to your system's master meter.

Record daily chlorine residuals. Public water systems required to chlorinate continuously must monitor the free chlorine residual levels daily and submit a report each month to the Office of Drinking Water (ODW) – WAC 246-290-440 and WAC 246-290-480. ODW recommends a minimum chlorine residual of 0.2 milligrams per Liter (mg/L) prior to the first customer and a trace at all other points in the distribution system. It is important for systems to monitor the free chlorine residual to ensure adequate and consistent levels of chlorine are maintained. Daily monitoring may also identify a failure in the chlorination equipment, which should be addressed immediately.

Check and record chlorine residual at the point of application. Chlorine is added to disinfect the water supplied to your customers. Chlorine also helps control microorganisms that might interfere with treatment plant processes. ODW can reduce the monitoring frequency under specific circumstances. In addition, ODW requires some water systems to maintain a minimum free chlorine residual at the entry point to ensure adequate treatment is provided. Contact your regional office or consultant regarding concerns or questions on whether your water system must maintain a minimum chlorine residual or frequency residuals must be recorded.

Use an EPA approved field test kit to measure free chlorine residuals. If you have not been testing the free chlorine residuals in your system, you will need to start by purchasing a diethyl-p-phenylenediamine (DPD) free chlorine residual test kit. Specifically, you will need a kit that reads from 0-3.5 parts per million (ppm) of free chlorine with a smallest reading increment of 0.1 ppm or mg/L. You may purchase a kit from a water treatment company or from a business that sells lab equipment, such as Hach Company (1-800-525-5940). Digital colorimetric test kits are available that offer greater accuracy if needed. Keep the manufacturer's instructions on proper use of the test kit in your Operations and Maintenance Manual and follow the recommended procedures. Note that high levels of manganese in the source water can interfere with these tests. Oxidized manganese will react directly with the DPD reagent developing a darker red color than the actual reading.

Maintain a minimum contact time as required by DOH Office of Drinking Water. Some water systems with groundwater sources are required to maintain a specific contact time. This requires that a minimum chlorine residual level be maintained at the point of entry, upstream of the first customer. Guidance on how to determine the minimum chlorine residuals for your water system is available for the Office or your water system design engineer.

Complete daily security checks. Source, pumping and storage facilities should be inspected daily to ensure that they provide adequate protection against vandalism and unauthorized entry. Appropriate fencing, locks, and locked well covers should be used to protect the facilities from stray livestock and tampering. Warning signs should be posted to deter trespassing. Warning signs should indicate a building and phone number for reporting incidents. Inspect fencing and gates for damage and needed repairs. Check hatches, locks, doors, windows, and vents for signs of intrusion or vandalism. Check all security lighting and alarms to ensure proper operation. Check that all well caps, seals, and vents are intact and sealed.

Check and record water levels in storage tanks. You should check the water level in each storage tank, as well as system pressure, daily to ensure tank levels are within normal operating conditions. Check for evidence of overflow, erosion under the splash pad, warning lights, wet ground, and so on. If the tank is overflowing, the pump controls may be out of operation. If the tank's level is below normal operating conditions, there may be a problem with system capacity or water level controls. Schedule planned improvements to install a high and low level alarm system, telemetry, and alarms and warning lights with direct notification to system operators.

Inspect well heads. Well head covers or seals prevent contaminated water and other material from entering the well. Visually inspect all well covers and pump platforms. They should be elevated above the adjacent finished ground level, sloped to drain away from the well casing, and free of cracks or excessive wear. Below grade wellheads can become flooded seasonally or after severe weather. Electrical conduits can be damaged, opening a pathway for contaminants to enter the well casing. Wellheads that are potentially vulnerable to vehicles can be severely damaged putting the continued operation of the system at risk. Protect the wellhead from vehicular damage by installing barriers.

Record well pump run times and pump cycle starts. If available, the pump run hour meters and cycle counters on the control panel, should be used to record the running times and number of cycle starts for your well and booster pumps. These readings should be made at about the same time every day. Comparing daily numbers will alert you to potential pump problems. You should develop a daily well pump log. Source pump cycling, turning on and off, more frequently than 20 times an hour may indicate a water-logged pressure tank. The loss of air in a bladder pressure tank or a hydropneumatic tank eliminated the pressure buffer provided by the compressible air causing the pressure switch to open and close when the pump stops and starts. This increased cycling wears out switches, controls and bladder pressure tanks. Many water systems use a pump alternator or a lead/lag pump controllers. The pump run hour meter and pump cycle counter can be used to verify these control systems are working properly.

Weekly

Check and record water levels in hydropneumatic pressure tanks. Pressure tanks come in all shapes and sizes. For small systems, normally a pressure tank will be a small tank of no more than 100 psi and no larger than 400 gallons. Maintaining pressure in these tanks is important for maintaining adequate pressure to the consumers. Hydropneumatic tanks can overfill, or waterlog, at times affecting overall system pressure. Monitoring pressure can assist an operator in identifying leaks, open valves and even well pump problems. Hydropneumatic tanks should have a sight tube installed to visually check the water level in the tank. Often the water level can be obvious from a condensation that forms on the lower portion where the water cools the metal wall. This temperature difference can also be detected by touch.

Record the pumping rate for each well or source water pump. Record the pumping rate from your well or source water pumps. You can do this if your system has a meter that registers flow. A change in pumping rate can indicate that you may have a pump problem. Keep in mind that pumping rates will vary based on water level in the well. For example, the pump produces less when the well has been drawn down from the static water level to the deepest pumping level or if the head the pump is pumping against is high.

Inspect booster pump stations. Check on the condition of the pumps, such as vibration, heat, seal, and controls to ensure that booster pumps are operating properly. Care should be taken when checking how hot a pump or motor may be. Check to make sure the pump operating times are equalized (the pumps automatically switch over). If this is done manually, then make the appropriate switch-over. Check and record meter readings and pressure gauge readings on suction and discharge sides of pumps.

Monthly

Inspect well pumps, motors, and controls. System operators should always be on the lookout for any defects in the system. Look, listen, and feel for unusual sights, sounds, or vibrations. Make sure seals are intact and the system is not running hot. Check all timers to ensure that pump operating times are equalized. Controls should be operated manually to verify that they are working. When you shut down or turn off equipment for repairs, make sure it will not start up accidentally and cause injury.

Take appropriate monthly water quality samples. Water quality samples should be taken routinely in accordance with state requirements. Take samples according to approved procedures and submit them to a certified laboratory or your state, as required, for analysis. Your state drinking water agency can give you an annual schedule for your required sampling. Use state forms and procedures, as required, and use a monthly sampling log to record all water sampling you conduct each month. Though you may only be required to sample for some contaminants quarterly or annually, you should still record the sample in the month it was taken. Keep records of all water quality tests for your own use and to respond to customer inquiries. Chapter 246-290-480 WAC specifies the length of time water quality analysis results must be kept. Contact your ODW regional office if you have questions about your water quality monitoring report (WQMR).

Inspect all pumphouse plumbing for leaks. Excess moisture in the pump room can damage motors and other equipment and create unsafe conditions for operators. Leaks also open pathways for contaminants to enter the water supply. Check all sump pumps for proper operation. Check all station alarms. Check your backup power source to ensure it will operate when needed.

Read electric meter at pumphouse and record. Monitor and note any unusual or unexpected changes in electricity use over time. If pumping accounts for a large proportion of your system's energy use, track water production and compare it to energy use. In the winter, you will also need to consider energy use for heating. High meter readings can also be an indicator that your booster or well pumps are working harder to perform their job, which could mean immediately, or at least soon, maintenance will be required.

Check wellhouse and pumphouse water pressures. Check the system pressure in the wellhouse and pumphouse in the distribution system. Accurate gauges are a mandatory requirement to monitor the performance of a pressurized water system. Pressure gauges should be installed on the suction and discharge lines of pumps. Pressure tanks should have pressure gauges on the discharge lines. These should be checked regularly and replace if damaged.

Submit chlorination reports. Chlorination Reports are due by the tenth of the following month to the DOH Office of Drinking Water. If you have been monitoring chlorine residuals but have not yet sent the reports to the Office, please send a copy of all reports for the current year. Columns *Meter Reading*, *Total gal/ft*^{3}, *Tank Level*, and *Solution Used* should be completed every time the chlorination facility is visited and no less than weekly. Columns *Free Chlorine Residual Measurements*, *Residual Sample Location*, and *Initials of the Sampler* are required to be completed daily. However, if your chlorine feed equipment is found to be operating consistently, this may be reduced to 5 days per week. The residuals should be tested from a representative point within your distribution system. In addition, free chlorine residuals should be measured each time you collect a sample for coliform testing with the time and location you collected the coliform sample and the chlorine residual result marked on the coliform lab slip.

Maintain a 15 to 30 day supply of chlorine in storage. Rotate stock to ensure chlorine supplies are not stored for an excessive length of time. This will reduce the decomposition and formation of unwanted byproducts, such as chlorite/chlorate. Sodium hypochlorite will lose strength over time. It will also lose strength when exposed to high temperatures or sunlight. For example, the rate strength lost doubles with every 5° C rise in temperature. Strong light, especially direct sunlight, causes sodium hypochlorite to break down. Stronger solutions can also lose their strength faster than weak solutions. For example, a 15% solution stored under cool, dark conditions might lose 0.1% strength over a week, while under bad conditions it could drop from 15% to 12-13% in one day. Because of this, you should always store your stock in containers with tight-covers under cool, dark conditions. You should also consider the costs of ordering and storing large amounts of stock versus smaller amounts (1 to 2 months supply). Remember that as your stock loses strength over storage, you will be losing money.

Inspect chlorinators for proper operation. Make sure the feeder is not broken or plugged and that it is adjusted correctly. Check to see if the chlorinator is supplying the correct dosage by measuring how much chlorine solution is being fed and then calculating the dosage. Calculate the dosage using the concentration of the chemical solution, the volume of solution pumped, and the volume of water treated over the same time period. Use a volumetric measuring device such as a graduated cylinder or the calibration cylinder in newer systems to measure the volume of chlorine solution added. Refer to your system's operations manual to determine the correct dosage. Please note that dates on the log are in reverse order to make calculations easier. Use proper personal protective gear when handling chemicals. Chemicals used in water treatment may be harmful to human health if not used properly. Material Safety Data Sheets should be made available to ensure proper usage.

Inspect storage tanks for sanitary deficiencies. Storage tanks should be inspected to ensure they are protected from contamination. Check vent screens for any openings to prevent small animals, bats, birds and insects or debris, dust and organic matter from entering the tank. Check overflows for flap valves or screens. Check the condition of the storage tank and look for cracks, structural damage, leaks, corrosion, and cathodic protection. Check the condition of the access hatch cover seal. This inspection should be documented, including photographs that will be useful for the next routine sanitary survey.

Inspect storage tanks for defects. Both interior and exterior inspections are needed to ensure maintenance of physical integrity, security and high water quality. The type and frequency of the inspection is driven by the type of tank, its susceptibility to vandalism, age, condition, and time since last cleaning or maintenance, history of water quality, plus other local criteria. Exterior inspections for obvious signs of intrusion or vandalism might occur daily or weekly. Periodic inspections of the storage tank for cracks, structural damage, integrity of hatches and vents, leaks, corrosion, and cathodic protection might occur on a monthly or quarterly basis. A comprehensive inspection of the interior is normally conducted when the tank is drained for cleaning. Industry standards recommend tanks be comprehensively inspected, inside and outside, every five years, except for newly constructed tanks, which should be inspected within 10 years of service and every five years thereafter.

Inspect and test standby power generation systems. Emergency power generators and switchover controls should be tested periodically to ensure they are maintained in proper operating condition. Manufacturer's recommendations should be followed. Written records of the checks, operational tests and maintenance performed should be kept.

Quarterly

Make sure fire hydrants are accessible. Fire hydrants provide water for fire fighting and are a means to flush the system. The hydrants should be easy to get to and highly visible. This includes removing snow drifts during the winter, tall grass or weeds during the summer, and painting the hydrants a highly visible color. Hydrants should be color coded according to the available fire flows. During inspection, be sure to check for tampering or vandalism. Record your findings in a log book. You should develop a log book to document your findings and standardize how these checks are made.

Clean pumphouse and grounds. Keeping your pumphouse and grounds clean will help with overall maintenance and operation of your system. The useful life of bearings can be reduced if dirt gets into lubricants. Also, dirt and moisture will form an insulating coating on motor windings and can cause motors to burn out. In addition to cleaning, screen all drain and vent openings in the building to prevent entry by animals and insects, and in the summertime, mow the areas around the pumphouse and storage tanks. Make sure grounds maintenance addresses fire hydrant accessibility. You should develop a weekly cleanliness log card to record your inspections.

Check pressure tank exteriors. Pressure tanks, including hydropneumatic tanks, can become corroded with rust. The exteriors of pressure tanks should be protected from corrosion and any obvious damage repaired. Hypochlorination systems may produce very corrosive vapors when there is inadequate room ventilation, chlorine solution leaks, open solution tanks, and so on. Severe pitting can dangerously weaken the pressure vessel and result in catastrophic failure, risking injury to water system operators. Ultrasonic testing can be done to check the wall thickness if required.

Inspect and clean chlorine solution feed lines and solution tanks. To ensure that your chlorine feed system functions properly, inspect the lines to make sure they're not clogged or kinked and that the solution tanks are clean. Regular cleaning of the chlorine feed systems will help prevent many breakdowns in this equipment. Inert solids will build up sediment on the bottom of the solution tank and can clog the filter or damage the chlorinator.

Calibrate chlorinators after overhaul. At least every three months, and particularly after the chlorinators have been overhauled, the pumps should be re-calibrated to ensure that they deliver the appropriate amount of chlorine solution to the system. Measure the amount of solution withdrawn by the pump over a given time period, record this value and speed/stroke length settings, and compare this rate with the desired feed rate. Refer to the manufacturer's instructions to adjust the feed pump accordingly. Be sure to record any new speed and stroke settings anytime a change is made.

Biannually

Exercise half of all mainline valves. It is important to exercise all mainline valves in the system at least once a year to ensure you can locate them and that they can be opened and closed during emergency shut-down periods. Record the number and direction of turns to closure. Be sure to describe the condition (rusted, new, leaking, failing) of each valve in the appropriate column in a log book. Half of the mainline valves should be exercised in March, and the other half should be exercised in six months. You should develop a map that identifies the valves and their locations. Keep this information in a secure place. It is important to be able to isolate the system or sections of the system. Any failures should be scheduled for repair. You should develop forms to track the valve inspections and repairs or to note any scheduled repairs.

Evaluate water quality monitoring of stored water. Check chlorine residuals, free, total and combined, before and after passage through the storage tank. Disinfectant levels will decline when retention time is increased. Estimate the contact time provided by the storage facility to determine if changes are needed to improve mixing, for example, the baffling coefficient. Storage tanks constructed with a single combined inlet and outlet line or with inlet and outlets located at the bottom can be modified to greatly improve water turnover. Disinfectant byproducts increase in stagnant biologically active water. Heterotrophic plate counts and nitrate and nitrite levels can also increase due to biological action.

Evaluate the water turnover of the stored water. Storage facilities should be operated to provide adequate water turnover and routinely fluctuate the water level in the tank. A variety of factors influence what the water turnover goal should be, including source water quality, disinfection, water use, fire flow, tank design, and so on. Some experts recommend a three to five day water turnover, modified as needed. Water systems with extreme seasonal variations in total water use have additional challenges to adapt operations to maintain good quality water.

Operate all valves inside the wellhouse, treatment plant and pumphouse. All valves in a system should be inspected and exercised routinely. The frequency of inspection depends on the type of valve, but you should inspect the valves at least twice a year. The inspection should include completely closing, reopening, and re-closing the valve until it seats properly. Record the number and direction of turns to closure. Leaking or damaged valves should be scheduled for repair. Use a log book to track inspections. The log card should be routinely updated throughout the year.

Check pressure relief valves. All pressure tanks in public water systems must have an American Society of Mechanical Engineers (ASME) certified pressure relief valve (PRV) to protect them for overpressure conditions. Labor and Industries safety regulations for unfired pressure vessels require ASME PRVs of adequate size to be installed on pressure tanks without intervening shut-off valves. Approved PRVs have tags indicating the ASME status and levels that can be used to verify function. Use caution and follow manufacturer's procedures.

Annually

Flush the distribution system and exercise and check fire hydrant valves. The entire system should be flushed in one direction, outward from plant or storage facility, at least once a year, depending on the quality of your source water. Systems with excessive iron or manganese that do not treat to remove these minerals may need to flush as often as monthly. Flushing clears any sediment in the lines. During the flushing, check the operation of the fire hydrant valves and observe the color of the water. Continue flushing until the water is clear. When operating a dry-barrel hydrant, you must open it completely so that the drain will become fully closed. Otherwise, water seeping through could result in hydrant damage from freezing. Make sure that any open hydrants are flushing away from private property. After flushing or using a hydrant, check to make sure the drain is working. Use a log book to track when flushing was completed.

Conduct a water audit and leak detection program. Unaccounted-for water should be determined by comparing the records of water production to water use to measure the quantity of water that was produced but not account for by service meter readings. Unaccounted-for water can result from leaks, inaccurate or broken meters, unmetered use, and errors in the billing process. Undetected water main leaks create conditions that put a water system's capacity to supply safe and reliable drinking water at risk. Leak detection can be a continuing challenge that strains the expertise and financial resources of a water system. A system may choose to purchase detection equipment and train staff to check for leaks, or they may hire an outside firm to perform leak detection surveys for them. Some systems use a combination of internal checks and contracting.

Perform storage tank maintenance. Maintenance activities include cleaning, painting, and repair to structures. State drinking water regulations requires adhering to American Water Works Association (AWWA) Standards, National Sanitation Foundation (NSF), and American National Standards (ANSI) for disinfection procedures and approval of coatings. Guidance indicates storage tanks should be drained, cleaned and disinfected annually. Painting is suggested on an as needed basis.

Prepare system for winter operations. This includes checking all exposed facilities such as pumps, valves, and pipes. Make sure all exposed facilities are properly insulated, the heaters in the treatment plant and pumphouse are operable and in good safe working condition, and vents are closed. Also, check all fire hydrants and sprinkler systems to ensure they are drained, check all propane or fuel tanks used for heating the pumphouse are toped off, and lower the water level in the storage tank just slightly. Circulating more of your water in storage facilities helps to prevent freezing. This task may be postponed until October or November based on local weather conditions. Make sure unnecessary equipment is properly decommissioned. See DOH Publication #331-314 for more information on start-up and shut-down procedures.

Clean storage tanks. Thoroughly clean tanks after any construction, maintenance or repairs. The surfaces of the walls and floors should be cleaned thoroughly with a high-pressure water jet, sweeping, scrubbing or other methods. All water and dirt should be flushed from the tank. There are several approved methods to clean and disinfect a storage tank. Two commonly used methods are described here. Cleaning and disinfection guidance documents are also available from AWWA.

Method A. Add chlorine to the water used to fill the tank during the disinfection process and mix thoroughly. Use only NSF-approved chlorine for this procedure. Maintain a chlorine residual of at least 50 mg/L for at least 6 hours and preferably for 24 hours. Don't forget to clean the tank above the water line at the same time. When the disinfection procedure is complete, properly dispose of the disinfection water and test the system. You may have to dechlorinate the disinfection water before disposing of it. Improper disposal can lead to contamination of potable water due to backflow or to unlawful surface water pollution. If you use a strong disinfectant solution to the clean the tank, after draining the disinfectant and filling the tank with water, the disinfectant in the tank may be diluted enough for pumping straight to the distribution system for domestic use.

Method B. Cleaning and disinfection procedures for large tanks of more than 1 million gallons may be different. When you are planning to take a tank out of service for cleaning and disinfection, make sure provisions are made to supply adequate water to the distribution system. If you are unsure how to provide service while the tank is off-line, contact your local technical assistance providers or your state drinking water agency for technical assistance. You may also want to consider the use of certified divers trained to do tank inspections and cleanings. This may prevent taking the tank out of service or losing significant amounts of water. After the tanks are cleaned, they will need to be properly tested before returning to service.

Check aesthetic water quality in storage tanks. Identify aesthetic problems that may be associated with inadequate storage facility design, construction or operation. Objectionable taste and odor may indicate poor water turnover promoting growth of taste and odor producing microorganisms. Improperly cured coating materials will result in unpleasant taste and odor in the stored water. Sediment build-up, especially from excessive iron or manganese, will harbor and provide nutrients for biofilm forming bacteria. Regular maintenance and thorough cleaning to reduce sediments will improve water quality. Stagnant water in an above-ground storage tank will tend towards the ambient temperature. Warmer water in the summer and fall months will increase biological growth leading to water quality problems. Water will also stratify in the tank further reducing turnover.

Perform preventive maintenance on wellhouse, treatment plant and pumphouse buildings. Facility piping, buildings, and tanks should be painted regularly to prevent deterioration. Store all pipes, plumbing fittings, chemicals, tools, and other materials in a safe place. Wellhouse ventilation should be checked to ensure there are no blockages and that fans are operable. Inspect for excessive rusting of exposed metal on pressure tanks, pipes, valves, controls, and fans that may be caused by corrosive chlorine vapors and poor ventilation. Deep pitting in pressure tank walls can compromise the structural integrity of the vessel. Wall thickness can be checked with ultrasonic testing devices.

Inspect wellhouse heater operation during winter months. Heaters should be checked throughout the winter on a daily basis to determine that they are working properly. Ensure that wiring and heater are above floor level and not placed where water leakage could cause a safety hazard, an electrical outage, or short any breakers.

Inspect, clean, and repair control panels in wellhouse. The control panels in the pumphouse and treatment plant should be inspected at least once a year for corrosion and other problems that could cause shorts or failures. Control panels should be carefully cleaned with air. Repair the panels if needed.

Contact an electrician to check running amps on well pumps. A change in running amps can indicate a change in the condition of the motors or pumps. When pumps start drawing more amps, it generally means that the motors should be repaired. Checking the amps and voltage on pumps can be a complicated and dangerous task; **do not attempt it yourself**. Contact an electrician to complete this procedure. This task should be performed at least once a year and any time you sense a problem with your pump, such as unusual sounds, vibrations, or the pump is running hot.

Check and record static and pumping levels of each well. This task is important for determining the reliability of the aquifer and for establishing baseline information that can be useful if others tap into the aquifer or take actions that will affect it, such as gravel mining. The static level is the level of the water in a well when the pump is not operating. The pumping level is the distance of the available pool while water is being drawn. You can check these levels by using bubbler lines, electrical sensors, or manual drop lines. The pumping level should be measured at various stages of pumping. You should also measure the recharge time, the amount of time it takes to return to static level. All equipment must be disinfected and handled in a way to prevent contamination of the well. You should develop a monthly static and pumping level log book.

Review Emergency Response Plans. Review all contacts for accuracy, make sure all equipment is working, and ensure all procedures match the plant conditions as they presently exist. Contact your local emergency response agency to update contacts, new processes, or chemical inventories.

Check instrumentation for proper signal input/output. Check to make sure each instrument is working properly. Make a log for each piece of equipment to record readings. Record the manufacturer specifications and notes on the log to make equipment information easily accessible.

Maintain air compressors. Air compressors are often used with water level controls to maintain the proper air/water balance in the larger hydropneumatic tanks. Air intake filters must be kept clean to maintain airflow. Dirty clogged filters must be replaced and cleaned thoroughly. Moisture traps, built into the filter/regulator, are used to catch moisture and dirt particles so they are not introduced into the pressure tank. Follow manufacturer's instructions to do this. Belt driven air compressors need to be covered with safety guards. Operators can become entangled in unprotected belts and seriously injured. Check air compressors and motors for any signs of malfunctions. Unusual noises, vibrations, odors, and heat generation can indicate mechanical problems and should be immediately investigated. Compressors that do not reach preset tank pressure must be evaluated. Bearings on most air compressors need to be lubricated. Special oils and lubricants must be used to prevent contamination of the water in the pressure tank.

Recommended Web Sites and Publications

Web sites

Department of Health Office of Drinking Water
http://www.doh.wa.gov/ehp/dw

U.S. Environmental Protection Agency (EPA) – Ground Water and Drinking Water
http://www.epa.gov/safewater/

U.S. EPA Small Systems Information and Guidance
http://www.epa.gov/safewater/smallsys/ssinfo.htm

U.S. EPA Publications Search
http://www.epa.gov/epahome/pubsearch.html

National Drinking Water Clearing House
http://www.nesc.wvu.edu/ndwc/

American Water Works Association
http://www.awwa.org/

Publications

Asset Management: A Handbook for Small Water Systems
EPA PUB 816-R-03-016

Strategic Planning: A Handbook for Small Water Systems
EPA PUB 816-R-03-015

Drinking Water Security for Small Systems Serving 3,300 or Fewer Persons
EPA PUB 817-R-05-001

Cross Connection Manual
EPA PUB 816-K-03-002

Setting Small Drinking Water System Rates for a Sustainable Future
EPA PUB 816-R-05-006

Start-up and Shut-down Assistance for Seasonal Non-Community Water Systems
DOH Publication #331-314

Coliform Public Health Advisory Packet
DOH Publication #331-260

Nitrate Public Health Advisory Packet
DOH Publication #331-259

Water Rates: Paying for Drinking Water
DOH Publication #331-327

Pressure tank supports. Pressure tanks must be supported to prevent tipping or falling. Hydropneumatic tanks tend to be larger and very heavy when filled with water. Supports must be sturdy and maintained in good condition. Stacked blocks or boards can fail during an earthquake. Evaluate the structural condition of the supports and level of the seismic protection provided. Consult a qualified authority if you are unsure. Failure will result in extensive damage to any facilities near the pressure tank. Water leaks will damage more equipment.

Overhaul chlorinators, including O rings, check valves, and diaphragms. Chemical feed pumps should be completely overhauled at least once a year. The overhaul should include cleaning the feeder head, cleaning and checking all valves and O rings for wear, and cleaning and checking the condition of check valves and pump control valves. Replace any worn-out parts, including diaphragms. Spare parts should be kept on hand so breakdowns can be repaired quickly and worn parts can be replaced when the feeder is disassembled for cleaning. A chemical feed pump repair and spare parts kit should be kept in the treatment building. Recalibrate the chlorinator to ensure they deliver the appropriate amount of chlorine solution to the system.

Purchase a backup spare chlorinator. It is highly recommended to have a spare chlorinator on hand for emergencies where repairs are not possible and disruption to service is not acceptable. There may be other approaches that offer a similar level of reliability.

Inspect chemical safety equipment and repair or replace as needed. Review the use of all safety equipment and update safety training. Chemical safety equipment should be checked and tested at least once each year to be certain that it is operable. Follow the manufacturer's instructions on the proper upkeep of all safety equipment, including portable ventilators or respirators, safety harnesses or belts, goggles, gloves, hard hats, and protective clothing. Detection devices for hazardous gases should be calibrated based on the manufacturer's instructions. All equipment should be repaired or replaced as needed. Review all safety procedures. You should develop a safety log book to record routine safety maintenance.

Maintain a log of water line repairs. Water distribution line repairs should be documented, especially when there are repairs/clamps, and so on, placed on the line. These types of repairs are not normally intended for long-term/permanent repairs, but are often performed with that intent. A thorough record of line replacements may help identify areas of the distribution line that are more prone to failure due to age, vibration, or other causes.

Coliform Monitoring Plan for: _Timberlake Community Club_____

A. System Information

Plan Date: 7/9/15

Water System Name Timberlake Community Club	**County** Mason	**System I.D. Number** 88370Y
Name of Plan Preparer Nadine Stock	**Position** Project Engineer	**Daytime Phone #** (425) 637-3693
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	SO1, Well 1, 380 ft., 180 gpm SO2, Well 2, 400 ft., 250 gpm SO3, Well 3, 409 ft., 280 gpm S04, WF (SO1, SO2, SO3), 409 ft., 710 gpm	
Storage: List and Describe	Concrete Reservoir – 60,000 gallons (divided into 2 – 30,000 gallon reservoirs) Steel Reservoir – 200,000 gallons	
Treatment: Source Number & Process	Source water is treated with a liquid sodium hypochlorite solution. An injection system injects solution into source water prior to its entering the 200,000 gallon steel reservoir. Sodium hypochlorite solution can also be injected into the 60,000 gallon concrete reservoir if required.	
Pressure Zones: Number and name	One pressure zone	
Population by Pressure Zone	2,015 residents	
Number of Routine Samples Required Monthly by Regulation: 2	**Number of Sample Sites Needed to Represent the Distribution System:** 2	
***Request DOH Approval of Triggered Source Monitoring Plan?** **Yes** ☐ **No** ☒		

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

B. Laboratory Information

Laboratory Name Thurston County Laboratory (at Mason County Public Health)	**Office Phone #** (360) 867-2631
Address 415 N 6th Street, Bldg 8 Shelton, WA 98584	**After Hours #** N/A
Hours of Operation PICK-UP: Monday - Friday, 8 am - 4:30 pm DROP-OFF: Monday and Tuesdays only, 8 am - 4:30 pm	
Contact Name Erik Iverson	

Emergency Laboratory Name Thurston County Laboratory (at Thurston County Court House)	**Office Phone #** 360-867-2631
Address 2000 Lakeridge Drive SW, Bldg 1, 2nd Floor Olympia, WA 98502	**After Hours #** N/A
Hours of Operation PICK-UP: Monday – Friday, 8 am – 5 pm* DROP-OFF: Bacteria Samples: Monday – Wednesday, 8 am – 5 pm* and Thursday, 8 am - 12:30 pm* Nitrate Samples: Monday and Tuesday Only, 8 am - 5 pm* **The Permit Assistance Center (PAC), 2nd floor, Bldg 1, is closed at 12:30 PM each workday. To accommodate sampling needs, bottles can be picked up at the Main Reception Desk (on the 1st floor) between noon and 5 pm each day.*	
Contact Name Erik Iverson	

C. Wholesaling of Groundwater

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

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. Div. 3/Lot 114 (Routine)	**1-1. Div. 3/Lot 114 (Repeat Sample)**	**S04**
	1-2. Div. 3/Lot 15 (Repeat Upstream)	
	1-3. Div. 3/ Lot 12 (Repeat Downstream)	
X2. Div. 5/Lot 45 (Routine)	**2-1. Div. 5/Lot 45 (Repeat Sample)**	**S04**
	2-2. Div. 5/Lot 47 (Repeat Upstream)	
	2-3. Div. 5/Lot 92 (Repeat Downstream)	
X3. Div 7/Lot 91 (Routine)	**3-1. Div. 7/Lot 91 (Repeat Sample)**	**S04**
	3-2. Div. 7/Lot 47 (Repeat Upstream)	
	3-3. Div. 7/Lot 57 (Repeat Downstream)	
X4. Div. 8/Lot 17 (Routine)	**4-1. Div. 8/Lot 17 (Repeat Sample)**	**S04**
	4-2. Div. 8/Lot 20 (Repeat Upstream)	
	4-3. Div. 8/Lot 15 (Repeat Downstream)	
X5. Div. 9/Lot 96 (Routine)	**5-1. Div. 9/Lot 96 (Repeat Sample)**	**S04**
	5-2. Div. 9/Lot 41 (Repeat Upstream)	
	5-3. Div. 9/Lot 36 (Repeat Downstream)	

X6. Div 2/Lot 40 (Routine)	**6-1. Div. 2/Lot 40 (Repeat Sample)**	**S04**
	6-2. Div. 1/Lot 52 (Repeat Upstream)	
	6-3. Div. 2/Lot 35 (Repeat Downstream)	
X7. Div. 10/Lot 48 (Routine)	**7-1. Div. 10/Lot 48 (Repeat Sample)**	**S04**
	7-2. Div. 10/Lot 24 (Repeat Upstream)	
	7-3. Div. 10/Lot 46 (Repeat Downstream)	
X8. Div. 11/Lot 1 (Routine)	**8-1. Div. 11/Lot 1 (Repeat Sample)**	**S04**
	8-2. Div. 11/Lot 3 (Repeat Upstream)	
	8-3. Div. 10/Lot 1 (Repeat Downstream)	
X9. Div 12/Lot 5 (Routine)	**9-1. Div. 12/Lot 5 (Repeat Sample)**	**S04**
	9-2. Div. 12/Lot 7 (Repeat Upstream)	
	9-3. Div. 12/Lot 1 (Repeat Downstream)	
X10. Div. 1/Lot 148 (Routine)	**10-1. Div. 1/Lot 148 (Repeat Sample)**	**S04**
	10-2. Div. 1/Lot 146 (Repeat Upstream)	
	10-3. Div. 1/Lot 150 (Repeat Downstream)	

X11. Div. 4/Lot 24 (Routine)	**11-1. Div. 4/Lot 24 (Repeat Sample)**	**S04**
	11-2. Div. 4/Lot 26 (Repeat Upstream)	
	11-3. Div. 4/Lot 56 (Repeat Downstream)	
X12. Div 6/Lot 50 (Routine)	**12-1. Div. 6/Lot 50 (Repeat Sample)**	**S04**
	12-2. Div. 6/Lot 33 (Repeat Upstream)	
	12-3. Div. 6/Lot 52 (Repeat Downstream)	

*** 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:

1. Two bacteriological samples and a residual report are required to be submitted to DOH each month. See Operations and Maintenance Manual for additional information and instructions.
2. Avoid taking routine coliform samples during weeks that contain major holidays and vacations unless you know trained staff and lab capacity are available to respond to unsatisfactory sample results.
3. Take routine coliform samples to the lab on Mondays whenever possible so that another set of tests can be taken on Tuesday if there are unsatisfactory sample results.
4. Take the following items when collecting samples:
   a. Total of three 100mL sample bottles (two for required samples and one for backup)
   b. Both sample taps (they are different)
   c. The LaMotte test kit (a free residual and total residual are needed in the report)
   d. The propane blow torch
5. If the sample site is no longer a good sample site, substitute with an acceptable site in the same area. If the condition change cannot be resolved, choose a permanent new sample site and update this CMP.
6. To take the routine coliform samples, follow the steps below:
   a. Attach the sampling taps at the sample location
   b. Turn on the tap and let run for at least five minutes. Before collecting the sample, reduce the down to a thin stream, then let the water run one minute.
   c. Complete the residual test
   d. Record both free and total residuals on the form under routine distribution sample
   e. Turn the water off and torch the end of the sample tap
   f. Let the water flow again with a slight flow for at least one minute
   g. Fill the sample bottle to the fill line/ shoulder

h. Place cap on the sample bottle.
i. Be careful not to touch the inside of the cap or bottle or set the cap down.
j. Be extra careful if it's raining - a rain drop in the sample will cause an unsatisfactory test.

7. The Total Coliform Rule requires the collection of repeat samples within 24 hours when a routine distribution system sample is unsatisfactory. The Groundwater Rule requires the collection of triggered source samples within 24 hours when a routine sample is unsatisfactory if all or a part of the water supply comes from a groundwater source.
   a. In the event of an unsatisfactory routine distribution system sample, take a total of four repeat samples as noted in the table above.
8. File lab results and residual reports in an easily accessible location.

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

We will sample Well Field S04 as a blended sample because S01, S02 & S03 have been classified as wells of a well field and all have similar aquifer characteristics.

F. Routine Sample Rotation Schedule

Month	Routine Site(s)	Month	Routine Site(s)
January	X4, X12	July	X4, X12
February	X2, X10	August	X2, X10
March	X3, X6	September	X3, X6
April	X7, X11	October	X7, X11
May	X1, X8	November	X1, X8
June	X5, X9	December	X5, X9

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. Div. 3/Lot 114	1. X1 – Div. 3/Lot 114
	2. X2 – Div. 5/Lot 45
	3. X3 – Div. 7/Lot 91
	4. X4 – Div. 8/Lot 17
	5. X5 – Div. 9/ Lot 96
X2. Div. 5/Lot 45	1. X2 – Div. 5/Lot 45
	2. X3 – Div. 7/Lot 91
	3. X4 – Div. 8/Lot 17
	4. X5 – Div. 9/ Lot 96
	5. X6 – Div. 2/Lot 40

X3. Div. 7/Lot 91	**1. X3 – Div. 7/Lot 91** **2. X4 – Div. 8/Lot 17** **3. X5 – Div. 9/ Lot 96** **4. X7 – Div. 10/Lot 48** **5. X8 – Div. 11/Lot 1**
X4. Div. 8/Lot 17	**1. X4 – Div. 8/Lot 17** **2. X5 – Div. 9/ Lot 96** **3. X6 – Div. 2/Lot 40** **4. X7 – Div. 10/Lot 48** **5. X8 – Div. 11/Lot 1**
X5. Div. 9/Lot 96	**1. X5 – Div. 9/ Lot 96** **2. X6 – Div. 2/Lot 40** **3. X7 – Div. 10/Lot 48** **4. X8 – Div. 11/Lot 1** **5. X9 – Div. 12/Lot 5**
X6. Div. 2/Lot 40	**1. X6 – Div. 2/Lot 40** **2. X7 – Div. 10/Lot 48** **3. X8 – Div. 11/Lot 1** **4. X9 – Div. 12/Lot 5** **5. X10 – Div. 1/Lot 148**
X7. Div. 10/Lot 48	**1. X7 – Div. 10/Lot 48** **2. X8 – Div. 11/Lot 1** **3. X9 – Div. 12/Lot 5** **4. X10 – Div. 1/Lot 148** **5. X11 – Div. 4/ Lot 24**

X8. Div. 11/Lot 1	**1. X8 – Div. 11/Lot 1** **2. X9 – Div. 12/Lot 5** **3. X10 – Div. 1/Lot 148** **4. X11 – Div. 4/ Lot 24** **5. X12 – Div. 6/ Lot 50**
X9. Div. 12/Lot 5	**1. X9 – Div. 12/Lot 5** **2. X10 – Div. 1/Lot 148** **3. X11 – Div. 4/ Lot 24** **4. X12 – Div. 6/ Lot 50** **5. X1 – Div. 3/Lot 114**
X10. Div. 1/Lot 148	**1. X10 – Div. 1/Lot 148** **2. X11 – Div. 4/ Lot 24** **3. X12 – Div. 6/ Lot 50** **4. X1 – Div. 3/Lot 114** **5. X2 – Div. 5/Lot 45**
X11. Div. 4/Lot 24	**1. X11 – Div. 4/ Lot 24** **2. X12 – Div. 6/ Lot 50** **3. X1 – Div. 3/Lot 114** **4. X2 – Div. 5/Lot 45** **5. X3 – Div. 7/Lot 91**
X12. Div. 6/Lot 50	**1. X12 – Div. 6/ Lot 50** **2. X1 – Div. 3/Lot 114** **3. X2 – Div. 5/Lot 45** **4. X3 – Div. 7/Lot 91** **5. X4 – Div. 8/Lot 17**

H. *E. coli*-present response plans

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.	☐	☐	☐	☐
We 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.	☐	☐	☐	☐
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 service 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? _____ 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.	☐	☐	☐	☐

Distribution System *E. coli* Response Plan

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

1. Call DOH. See the Timberlake Community Club Emergency Response Plan for more details and contact information.
2. Collect repeat and triggered source samples per Part D. Collect additional investigative

samples as necessary.

3. Inspect water system facilities, including treatment plant for proper operation.
4. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample.
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.
8. *Increase chlorine dose to 1.0 mg/L.*
9. Make necessary repairs, disinfect and flush affected portions of the distribution system. Take follow-up samples to confirm removal of contamination in all affected areas.
10. *Prepare draft news release and website changes.*
11. *Collect investigative samples every 10 to 12 hours until repeat results are known.*
12. *Issue news release and make website changes if repeats are coliform or E. coli present.*

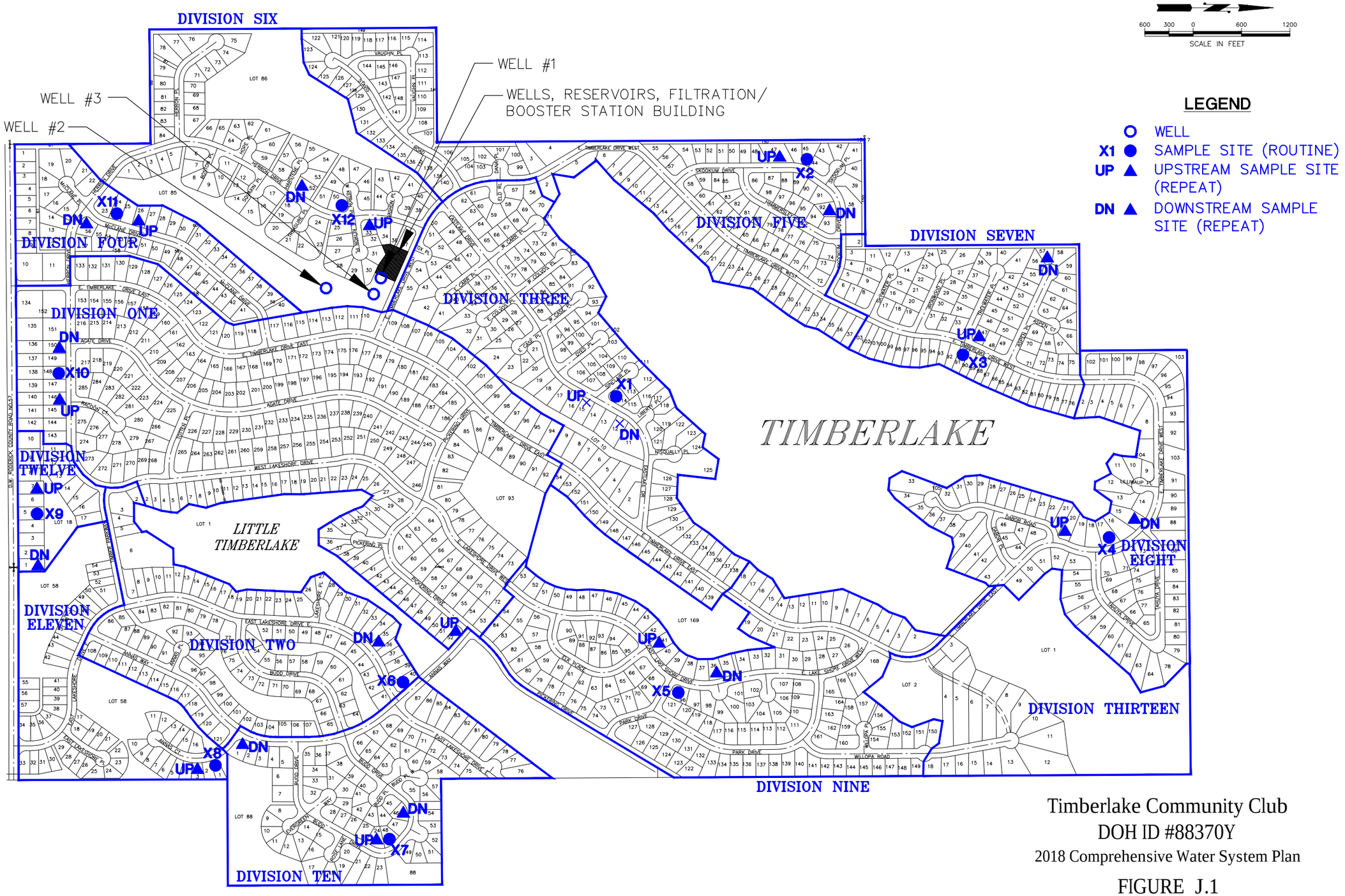
E. coli-Present Triggered Source Sample Response Plan Source S04

If we have *E. coli* in Source S04 water we will immediately:

1. Call DOH. See the Timberlake Community Club Emergency Response Plan for more details and contact information.
2. Distribute required notice.
3. Interview staff.
4. *Locate a source of bottled water to supply customers with long-term supply of bottled water for individuals who can't boil their water.*
5. 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.
6. *Increase chlorine dose to 1.0 mg/L at the entry point of the distribution system.*
7. *Begin compliance monitoring at the entry point to the distribution system.*
8. *Ask DOH to review Contract Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.*

I. System Map

See attached *Figure J.1 Coliform Monitoring Plan System Map and Sampling Locations*.



600 300 0 600 1200

SCALE IN FEET

LEGEND

- WELL
- X1 SAMPLE SITE (ROUTINE)
- UP UPSTREAM SAMPLE SITE (REPEAT)
- DN DOWNSTREAM SAMPLE SITE (REPEAT)

Timberlake Community Club
DOH ID #88370Y
2018 Comprehensive Water System Plan

FIGURE J.1
COLIFORM MONITORING PLAN
SYSTEM MAP AND SAMPLING LOCATIONS

CHS ENGINEERS

USER: Evan Henke PLOTTING DATE: 7/29/2015 FILE LOCATION: K:\50-Timberlake\2014\501401-WSPUpdate\2016 WSP\CAD\Figure J-1.dwg

TIMBERLAKE COMMUNITY CLUB, INC.
CROSS-CONNECTION CONTROL PLAN
WATER USE QUESTIONNAIRE
CROSS CONNECTION REPORT FORM

REQUIRMENT OF PROGRAM

Timberlake Community Club hereinafter referred to as "the Purveyor", has the responsibility to protect the public water system from contamination due to cross connections. A cross connection may be defined as "any actual or potential physical connection between a potable water line and any pipe, vessel or machine that contains or has a probability of containing a non-potable gas or liquid, such that it is possible for a non-potable gas or liquid to enter the potable water system by backflow".

All public water systems are required to develop and implement cross-connection control (CCC) programs. The CCC requirements are contained in Washington Administrative Code (WAC) 246-290-490 of the Group A Drinking Water Regulations. The minimum required elements of a CCC program are:

1. Establishment of legal authority and program policies;
2. Evaluation of premises for cross-connection hazards;
3. Elimination and/or control of cross connections;
4. Provision of qualified personnel;
5. Inspection and testing of backflow preventers;
6. Quality control of testing process;
7. Response to backflow incidents;
8. Public education for consumers;
9. Record keeping for CCC program; and
10. Special requirements for reclaimed water use.

Other CCC program requirements include:

1. Coordination with the Local Administration Authority (LAA), i.e., the local building or plumbing official regarding CCC activities;
2. Prohibition of the return of used water into the public water system (PWS) distribution system; and
3. Inclusion of a written CCC program in a Water System Plan (WSP) or a Small Water System Management Program (SWSMP).

Note: Throughout this plan the term *Member* is used. Member as used herein means the property owner and/or occupant of the premises served by the PWS (i.e., whoever interfaces with the PWS regarding water service). Also, unless otherwise defined, all CCC-related terms used in this program have the same definitions as those contained in WAC 246-290-010 of the Washington State Drinking Water Regulations.

PROGRAM OBJECTIVES

The objectives of the CCC program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system; and
2. Reasonably reduce the Purveyor's exposure to legal liability arising from the backflow of a contaminate originating from the customer's plumbing system and then supplied to other customers.

SUMMARY OF PROGRAM DECISIONS

The following table summarizes the major policy and program decisions adopted for the Timberlak Community Club Water System. The items in the table represent CCC program areas that have more than on acceptable approach or option.

Acronyms and Abbreviations

ABPA	American Backflow Prevention Association
AG	air gap
ANSI	American National Standards Institute
ASR	Annual Summary Report
AVG	atmospheric vacuum breaker
AWWA	American Water Works Association
BAT	backflow assembly tester
BPA	backflow prevention assembly
CCC	cross-connection control
CCS	cross-connection control specialist
CV	single-check valve
DCAV	dual-check with atmospheric vent
DCDA	double-check detector assembly
DCV	dual-check backflow preventer
DCVA	double-check valve assembly
DOH	Washington State Department of Health
EPA	U.S. Environmental Protection Agency
HBVB	hose bib vacuum breaker
IAPMO	International Association of Plumbing and Mechanical Officials
L&I	Washington State Department of Labor and Industries
LAA	Local Administrative Authority
MCL	maximum contaminant level
NTNC	non-transient non-community
PNWS-AWWA	Pacific Northwest Section – American Water Works Association
psi	pounds per square inch
PVBA	pressure vacuum breaker assembly
PVC	polyvinyl chloride
PWS	public water system

QA/QZ	quality assurance/quality control
RCW	Revised Code of Washington
ROW	right-of-way
RPBA	reduced-pressure backflow assembly
RPDA	reduced-pressure detector assembly
SBCC	Washington State Building Code Council
SDWA	Safe Drinking Water Act
SRC4	Spokane Regional Cross-Connection Control Committee
SVBA	spill-resistant vacuum breaker assembly
SWSMP	small water system management plan
The Group	Western Washington Cross-Connection Prevention Professionals Group
TNC	transient non-community
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
UPC	Uniform Plumbing Code
USC	University of Southern California
USCFCCCHR	University of Southern California – Foundation for Cross-Connection Control and Hydraulic Research
WAC	Washington Administrative Code
WSP	water system plan

DEFINITIONS RELATED TO CROSS-CONNECTION CONTROL

"Approved air gap" means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one inch, when unaffected by vertical surfaces (sidewalls); and
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

"Approved atmospheric vacuum breaker" means an AVB of make, model, and size that is approved by the department. *AVBs that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the local administrative authority are considered approved by the department.

"Approved backflow preventer" means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms "approved backflow preventer," "approved air gap," or approved backflow prevention assembly" refer only to those approved backflow preventers relied upon by the purveyor for the

protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

"Approved backflow prevention assembly "means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

"Backflow" means the undesirable reversal of flow of water or other substances through a cross connection into the public water system or consumer's potable water system.

"Backflow assembly tester" means a person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

"Backpressure" means a pressure (caused by a pump, elevated tank or piping, boiler, or other means) on the consumer's side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

"Backsiphonage" means backflow due to a reduction in system pressure in the purveyor's distribution system and/or consumer's water system.

"Combination fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer's potable water system.

"Consumer" means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, "consumer" means the owner or operator of a water system connected to a public water system through a service connection.

"Consumer's water system." as used in WAC 246-290-490, means any potable and/or industrial water system that begins at the point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

"Cross connection" means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

"Cross-connection control program" means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross connections as required in WAC 246-290-490.

"Cross-connection control specialist" means a person holding a valid CCS certificate issued in accordance with Chapter 246-292 WAC.

"Cross-connection control summary report" means the annual report that describes the status of the purveyor's cross-connection control program.

"Flow-through fire protection system" means a fire sprinkler system that:

- Is supplied only by the purveyor's water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

"High health cross-connection hazard" means a cross connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or waste.

"In-premises protection" means a method of protecting the health of consumers served by the consumer's potable water system, located within the property lines of the consumer's premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

"Local administrative authority" means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

"Low health cross-connection hazard" means a cross connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

"Premises Isolation" means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer's water system from the purveyor's distribution system.

"Reclaimed water" means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur, and it is no longer considered wastewater.

"Unapproved auxiliary water supply" means a water supply (other than the purveyor's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

"Uniform Plumbing Code" means the code adopted under RCW 19.27.031(4) and amended under chapter 51-46 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer's premises.

"Used water" means water which has left the control of the purveyor.

Abbreviations and Acronyms

AG	air gap
AVB	atmospheric vacuum breaker
BAT	backflow assembly tester (for WAC 46-290-490)
CCS	cross-connection control specialist
DCDA	double check detector assembly
DCVA	double check valve assembly
IAPMO	International Association of Plumbing and Mechanical Officials
PVBA	pressure vacuum breaker assembly
RPBA	reduced pressure backflow assembly
RPDA	reduced pressure detector assembly
SVBA	spill resistant vacuum breaker assembly
UBC	Uniform Building Code
UL	Underwriters Laboratories Inc.
UPC	Uniform Plumbing Code

After Recording Return To:
Timberlake Community Club
2880 East Timberlake West Drive
Shelton, WA 98584-7936

DOCUMENT TITLE:	Timberlake Community Club Resolution 2010-11 Cross-Connection Control Policy
REFERENCE NUMBERS OF RELATED DOCUMENTS:	N/A
GRANTOR:	**Timberlake Community Club**
GRANTEES:	Public - residents of the Timberlake Community
LEGAL DESCRIPTION:	Timberlake Divisions 1 – 13
ASSESSOR'S PROPERTY TAX PARCEL NO.	Division 1 – 20018-50-00001 thru 22018-50-09162 Division 2 – 22017-50-00001 thru 22017-50-00908 Division 3 – 22018-51-00001 thru 22018-51-00902 Division 4 – 22018-52-00001 thru 22018-52-00061 Division 5 – 22018-53-00001 thru 22018-53-00903 Division 6 – 22018-54-00001 thru 22018-54-00088 Division 7 – 22017-50-00001 thru 22017-50-00104 Division 8 – 22007-51-00001 thru 22007-51-90933 Division 9 – 22017-51-00001 thru 22017-51-00169 Division 10 – 22017-52-00001 thru 22017-52-00088 Division 11 – 22017-53-00001 thru 22017-53-00900 Division 12 – 22018-55-00001 thru 22018-55-00018 Division 13 – 22008-50-00001 thru 22008-50-00900

Resolution No. 2011-01
Cross-Connection Control Policy

Whereas it is the responsibility of a water purveyor to provide water to the customer at the meter that meets Washington state water quality standards.

Whereas it is the water purveyor's responsibility to prevent the contamination of the public water system from the source of supply (i.e., to the customer's connection to the service pipe or meter);

Whereas it is a requirement of the Washington State Department of Health (DOH) for the Purveyor to establish a cross connection-control program satisfactory to DOH;

Whereas cross-connections within the customer's plumbing system pose a potential source for the contamination of the public water supply system;

Now be it resolved that the Timberlake Community Club Board of Directors, hereinafter referred to as the Purveyor, establishes the following service policy to protect the purveyor-owned water system from the risk of contamination. For public health and safety, this policy shall apply equally to all new and existing customers.

Definitions

Unless otherwise defined, all terms used in this resolution pertaining to cross-connection control have the same definitions as those contained in WAC 246-290-010 of the Washington State Drinking Water Regulations.

Prevention of Contamination

The customer's plumbing system, starting from the termination of the Purveyor's water service pipe, if considered a potential high-health hazard requiring the isolation of the customers' premises by a DOH-approved, customer-installed and maintained reduced-pressure principle backflow assembly (RPBA) or reduced-pressure detector assembly (RPDA). The RPBA or RPDA shall be located at the end of the Purveyor's water service pipe (i.e., immediately downstream of the meter). Water shall only be supplied to the customer through a DOH-approved, customer-installed and maintained RPBA or RPDA.

Notwithstanding the aforesaid, the Purveyor, upon an assessment of the risk of contamination posed by the customer's plumbing system and use of water, may allow:

- A single-family or duplex residential customer to reconnect directly to the water service pipe, i.e., without a purveyor-approved DCVA or RPBA.
- Any customer other than a single-family or duplex residential customer, as a minimum, to be supplied through a DOH-approved, customer-installed and maintained double-check valve assembly (DCVA) or double-check detector assembly (DCDA).

Conditions for Providing Service

Water service is provided based on the following terms and limitations:

1. The customer agrees to take all measures necessary to prevent the contamination of the plumbing system within his/her premises and the Purveyor's distribution system that may occur from backflow through a cross connection. These measures shall include the prevention of backflow under any backpressure or backsiphonage condition, including the disruption of the water supply from the Purveyor's system that may occur during routine system maintenance or during emergency conditions, such as a water main break.
2. The customer agrees to install, operate, and maintain at all times his plumbing system in compliance with the current edition of the Uniform Plumbing Code having jurisdiction as it pertains to the prevention of contamination and protection from thermal expansion, due to a closed system that could occur with the present or future installation of backflow preventers on the customer's service and/or at plumbing fixtures.
3. For cross-connection control or other public health-related surveys, the customer agrees to provide for the Purveyor's employees or agents free access to all parts of the premises during reasonable working hours of the day for routine surveys and at all times during emergencies.
4. The customer agrees to install all backflow prevention assemblies requested by the Purveyor and to maintain those assemblies in good working order. The assemblies shall be of a type, size, and make

approved by DOH and acceptable to the Purveyor. The assemblies shall be installed in accordance with the recommendations given in the most recently published edition of the *Cross Connection Control Manual, Accepted Procedures and Practice,* published by the Pacific Northwest Section, American Water Works Association, or latest edition thereof. *The assemblies shall be installed in accordance with Timberlake Community Club standards as stated in this program.*

5. The customer agrees to:
   a. Have all assemblies (e.g., RPBAs and/or DCVAs) that the Purveyor relies upon to protect the public water distribution system tested upon installation, annually thereafter and/or more frequently if requested by the Purveyor, after repair, and after relocation.
   b. Have all testing done by a purveyor-approved and currently DOH-certified Backflow Assembly Tester (BAT).
   c. Have the RPBA or DCVA tested in accordance with DOH-approved test procedures; and
   d. Submit to the Purveyor the results of the test(s) on Purveyor-supplied test report forms within the time period specified by the Purveyor.
6. The customer agrees to bear all costs for the aforementioned installation, testing, repair, maintenance and replacement of the RPBA, RPDA, DCVA or DCDA installed to protect the Purveyor's distribution system.
7. At the time of application for service, if required by the purveyor, the customer agrees to submit to the Purveyor plumbing plans and/or a cross-connection control survey of the premises conducted by a purveyor-approved and DOH-certified Cross-Connection Control Specialist (CCS).

   The cross-connection control survey shall assess the cross-connection hazards and list the backflow preventers provided within the premises. The results of the survey shall be submitted prior to the Purveyor turning on water service to a new customer.
8. For classes of customers other than single-family residential, when required by the Purveyor, the customer agrees to periodically submit a cross-connection control re-survey of the premises by a DOH-certified CCS acceptable to Purveyor. The Purveyor may require the re-survey to be performed in response to changes in the customer's plumbing or water use, or performed periodically (annually or less frequently) where the Purveyor considers the customer's plumbing system to be complex or subject to frequent changes in water use. The cost of the re-survey shall be borne by the customer.
9. Within 30 days of a request by the Purveyor a residential customer shall agree to complete and submit to the Purveyor a "Water Use Questionnaire" for the purpose of surveying the health hazard posed by the customer's plumbing system on the Purveyor's distribution system. Further, the residential customer agrees to provide within 30 days of a request by the Purveyor a cross-connection control survey of the premises by a DOH-certified CCS acceptable to the Purveyor.
10. The customer agrees to obtain the prior approval from the Purveyor for all changes in water use, and alterations and additions to the plumbing system, and shall comply with any additional requirements imposed by the Purveyor for cross-connection control.
11. The customer agrees to immediately notify the Purveyor and the local health jurisdiction of any backflow incident occurring within the customer's premises (i.e., entry of any contaminant/pollutant into the drinking water) and shall cooperate fully with the Purveyor to determine the reason for the backflow incident.
12. The customer acknowledges the right of the Purveyor to discontinue the water supply within 72 hours of giving notice to the customer, or a lesser period of time if required to protect public health, if the

customer fails to cooperate with the Purveyor in the survey of premises, in the installation, maintenance, repair, inspection, or testing of backflow prevention assemblies or air gaps required by the Purveyor, or in the Purveyor's effort to contain a contaminant or pollutant that is detected in the customer's system.

Without limiting the generality of the foregoing, in lieu of discontinuing water service, the Purveyor may install an RPBA on the service pipe to provide premises isolation, and recover all costs for the installation and subsequent maintenance and repair of the assembly, appurtenances, and enclosure from the customer as fees and charges for water. The failure of the customer to pay these fees and charges may result in termination of water service in accordance with the Purveyor's water billing policies.

13. Where the Purveyor imposes mandatory premises isolation in compliance with DOH regulations, or agrees to the customer's voluntary premises isolation through the installation of a RPBA immediately downstream of the Purveyor's water meter, the customer acknowledges his obligation to comply with the other cross-connection control regulations having jurisdiction (i.e., Uniform Plumbing Code). Although the Purveyor's requirements for installation, testing , and repair of backflow assemblies may be limited to the RPBAs used for premises isolation, the customer agrees to the other terms herein as a condition of allowing a direct connection to the Purveyor's service pipe.
14. The customer agrees to indemnify and hold harmless the Purveyor for all contamination of the customer's plumbing system or the Purveyor's distribution system that results from an unprotected or inadequately protected cross connection within the customer's premises. This indemnification shall pertain to all backflow conditions that may arise from the Purveyor's suspension of water supply or reduction of water pressure, recognizing that the air gap separation otherwise required would require the customer to provide adequate facilities to collect, store, and pump water for his/her premises.
15. The customer agrees that, in the event legal action is required and commenced between the Purveyor and the customer to enforce the terms and conditions herein, the substantially prevailing party shall be entitled to reimbursement of all incurred costs and expenses including, but not limited to reasonable attorney's fees as determined by the Court.
16. The customer acknowledges that the Purveyor's survey of a customer's premises is for the sole purpose of establishing the Purveyor's minimum requirements for the protection of the public water supply system, commensurate with the Purveyor's assessment of the degree of hazard.

    It shall not be assumed by the customer or any regulatory agency that the Purveyor's survey requirements for the installation of backflow prevention assemblies, lack of requirements for the installation of backflow prevention assemblies, or other actions by the Purveyor's personnel constitute an approval of the customer's plumbing system or an assurance to the customer of the absence of cross connections therein.

17. The customer acknowledges the right of the Purveyor, in keeping with changes to Washington State regulations, industry standards, or the Purveyor's risk management policies, to impose retroactive requirements for additional cross-connection control measures.

The Purveyor will enforce all Protective Covenants of Timberlake Community Club, as well as any other applicable recorded documents including Resolution 2011-01, Cross-Connection Control Program. All members of Timberlake Community Club are customers of the water system and will abide by the governing documents, covenants, rules, regulations and resolutions of the Association.

Implementation of the Cross-Connection Control Policy

The Purveyor will engage the services of a DOH-certified CCS to develop, implement and be in responsible charge of the Timberlake Community Club Water System's cross-connection control program.

The Purveyor will use the most recently published editions of the following publications as references and technical aids:

- Cross-Connection Control Guidance Manual for Small Water Systems, published by the DOH Office of Drinking Water.

The Purveyor will incorporate the written program plan into the Water System Plan for DOH approval when requested.

The Purveyor, in consultation with the aforementioned CCS, shall have the authority to make reasonable decisions related to cross connections in cases and situations not provided for in the resolution or written program.

If any provision in this resolution, or in the written cross-connection control program is found to be less stringent than or inconsistent with the Drinking Water Regulations (Chapter 246-290 WAC), or other Washington state statutes or rules, the more stringent state statute, rule, or regulation shall apply.

Resolution Passed: _____

Effective Date: _____

Signatures: _____
President, Timberlake Board of Directors

_____
Secretary, Timberlake Board of Directors

Cross-Connection Control Decision Summary Table for the Timberlake Community Club Water System

Decision Item	Decision
1. Type of Program (General, WAC 246-490(2)(e)	
a. Premises isolation only	

b. Premises isolation and in-premises protection (combination program)	X
2. Extent of Coordination with LAA (WAC 246-490(2)(d)	
a. Information exchange	X
b. Interaction	
c. Joint program	
3. Relationship with Customer (Element 1)	
a. Signed service agreement or contract	
b. Ordinance/resolution; implied service agreement	X
4. Enforcement of Correction Action (Element 1)	
a. Rely upon shut-off of water service	X
b. Rely upon purveyor-installed premises isolation	
5. Assessment and Re-assessment of Hazard (Element 2)	
a. By purveyor's staff or equivalent	
b. Own By cross-connection control specialist (CCS) employed by customer, report reviewed by purveyor's CCS	X
6. Location and Ownership of Premises Isolation Assembly (Element 3)	
a. On purveyor's service line	
b. On customer's service line	X
7. CCS Option – Purveyor's Program Management (Element 4)	
a. Purveyor's staff member certified	X
b. Inter-agency agreement or use other agency's CCS	X
c. Contract with consultant CCS	
8. Testing of Assemblies (Element 5)	
a. By Purveyor's staff or purveyor contracted backflow assembly tester (BAT)	X
b. By customer-employed (contractor) BAT	X
9. Cost Recovery (WAC 246-290-110(4)(h) and -105(4)(p)	
a. Borne by all customers (general water rates)	
b. Assessed to specific class (commercial meters)	
c. Each customer directly bears cost	X

The Timberlake Community Club water system has adopted a resolution (Resolution No. 2011-01), which authorizes the Purveyor to implement a CCC program. The resolution also authorizes the system to terminate water service to consumers who do not comply with the resolution. However, the primary method for protection of the distribution system will be the installation of a backflow preventer by the customer, at the customer's expense.

For customers supplied prior to the adoption of the attached resolution, an implied service contract allows the Purveyor to protect the distribution system from contamination through water shut-off.

SAMPLE LETTER – REQUEST TO SUBMIT TEST OF BACKFLOW PREVENTION ASSEMBLY (this will be sent on Timberlake Letterhead)

Date:

Customer Name & Address

Dear

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies have been installed on your water service(s) and/or within your plumbing system to protect our water distribution system. Annual testing is required to ensure that the backflow prevention assemblies properly function.

The purpose of this letter is to request that you now arrange for the annual testing of the reduced pressure principle (RPBA), double check valve (DCVA), and/or pressure vacuum breaker (PVBA or SVBA) assembly/assemblies described on the attached list. A Washington State Department of Health certified backflow assembly tester (BAT) must conduct the testing. Testing results should be sent to the address and abutted by (date)_____.

For your convenience, we are enclosing a list of backflow assembly testers pre-approved to test assemblies that protect our water system. Test report forms are also enclosed. The test report forms need to be properly completed by the BAT, signed by the customer/assembly owner, and returned to us.

Note: the Uniform Plumbing Code in effect in Washington also requires annual assembly testing. In addition to the testing required for the assemblies that protect the public water system (i.e. identified on the attached list), you may wish to have all of the remaining assemblies within your premises tested at this time.

If you have any questions please feel free to contact me at 360-427-8928.

Sincerely,

Arthur Bushey
Cross-Connection Control Program Manager

Enclosures: Pre-Approved BAT List
Assembly Test Report Forms

SAMPLE LETTER – SECOND NOTICE TO TEST BACKFLOW PREVENTION ASSEMBLY (this will be sent on Timberlake Letterhead)

Date

Customer Name & Address
Subject: Testing of Backflow Prevention Assembly – Second Notice
Frist Notice Date _____ Second Notice Date: _____

Dear

Washington State drinking water regulations, WAC 246-290-490, require public water systems to implement cross-connection control programs to protect the drinking water supply from contamination. As part of this program, backflow prevention assemblies were installed on your service or within your premises to protect our water distribution system from contamination. The WAC requires these assemblies to be tested annually to verify that they are in good working condition.

The assembly/assemblies identified in our letter of (date) (copy attached) must be tested by a Department of health certified Backflow Assembly Tester (BAT) upon installation and annually thereafter. This requirement is a condition of our system continuing to supply potable water to your premises. **According to our records, as of today's date, you have not submitted the requested Assembly Test Reports(s).** If you believe this is in error, please contact me as soon as possible at the number below.

If you have not submitted the Assembly Test Reports as requested, please:

- Immediately employ a DOH-certified BAT to test the listed assembly/assemblies; and
- Submit a signed copy of the completed Assembly Test Report(s) to me at the address above within 15 days of the date of this letter.

Your cooperation in this matter is essential for protecting your drinking water supply and the public water supply from contamination. Failure to comply with the annual assembly testing requirement will trigger and enforcement action by our system. Enforcement could include a shut-off of your water service.

If you have any questions, please contact me at 360-427-8928.

Sincerely,

Arthur Bushey
Cross-Connection Control Program Manager

Enclosure: First Test Notice Letter

LETTER REQUESTING CUSTOMER TO COMPLETE WATER USE QUESTIONNAIRE (TO BE SENT OUT EVERY 3-5 YEARS – ON TIMBERLAKE LETTERHEAD)

Date:

Customer Name & Address

Dear

Washington State drinking water regulations, WAC 246-290-490, require public water systems to develop and implement cross-connection control programs. Cross-connection control programs help protect public health by preventing contamination of the drinking water as it is delivered to water system customers. The attached brochure explains what a cross connection is, describes typical household cross connections and what you can do to help protect your drinking water.

For most residential customers, the cross-connection control hazard posed to the public water system is minimal. This is because your household plumbing was installed in compliance with the Uniform Plumbing Code. The Uniform Plumbing Code generally provides adequate protection of your potable water piping and our public water distribution system from cross connections. However, a few customers with special plumbing or activities on their premises may pose an increased health risk to other customers served by our system. These customers may need to have a backflow preventers installed on their service lines or provide alternate protection to prevent contamination of the public water system.

Please complete the attached questionnaire by checking the applicable boxes on the table; and return the completed, signed questionnaire by (date) to the address shown on the letterhead.

Thanks in advance for filling out the questionnaire. We appreciate your cooperation in helping us to protect the drinking water we deliver to our customers. If you have any questions about the survey or how to fill out the questionnaire, please contact me at 360-427-8928. We will review your questionnaire and determine whether we need to contact you for further information.

Sincerely,

Arthur Bushey
Cross-Connection Control Program Manager

Enclosures: CCC Brochure
Water Use Questionnaire

TIMBERLAKE COMMUNITY CLUB, INC.
2880 East Timberlake West Drive
Shelton, WA 98584-7936
Phone: 360-427-8928 ~ Fax: 360-427-1755
timberlakewater@hctc.com
~Pride in Ownership~

January 2, 2013

Attn: All Timberlake Community Club, Inc. building permit applicants

The Timberlake Water Board and the Timberlake Board of Directors have approved as part of the Timberlake Cross Connection Control Program the following:

1. As of January 1, 2013 a backflow prevention assembly (a minimum of a double check valve assembly) DCVA will be required for all new construction within Timberlake Community Club.

2. All installed backflow prevention assemblies shall be approved for installation in Washington State.

   A) Once installed the backflow prevention assembly must be inspected and tested by a certified Backflow Assembly Tester (BAT). After the initial testing and report the assembly must be tested annually and all test reports sent to Timberlake Community Club, 2880 E Timberlake Dr. W, Shelton, WA 98584.

   B) A water turn on will not be issued until a satisfactory test report from a certified Backflow Assembly Tester is received by the Timberlake Community Club and the Timberlake Water Department.

   C) Information on backflow assemblies and a list of backflow assembly testers is available at the Timberlake Water Department.

   D) Timberlake members have the option of being on the Timberlake annual testing list (preferred) or hiring their own certified backflow assembly tester.

Sincerely,

Arthur Bushey, WDM2/CCS
Water System Operator

TIMBERLAKE COMMUNITY CLUB, INC.
CROSS-CONNECTION CONTROL PLAN
WATER USE QUESTIONNAIRE
CROSS CONNECTION REPORT FORM

Member Name
Street Address
City, State, Zip code

Please answer the following questions and return the questionnaire to Timberlake Community Club, 2880 E Timberlake W Drive, Shelton, WA 98584 no later than _____.

YES	NO	QUESTION
		Do you have any of the following:
		Hot Tub
		Swimming Pool
		Jacuzzi
		Underground Sprinkler System
		Drip Irrigation System
		Green House
		Fire Sprinkler System
		Ornamental Fountain
		Do you use:
		Antifreeze Flush Kits
		Insecticide/Fertilizer Sprayers
		Dark Room Equipment
		Do you or anyone in your home use a portable dialysis machine?
		Do you have a water softener or any other type of treatment connected to the drinking water supply?
		Is there 30 feet in elevation rise from your meter to the point of use?
		Do you have an auxiliary water supply?
		Do you have a backflow preventer installed on your water line at this time?
		Do you have a booster pump?
		Do you have any situation that you are aware of that could create a cross-connection contamination?
		Lake, creek, river, or spring on your property?

Please notify the Water Department immediately if any of the above condition(s) ever change on your property.

_____ _____
Member Signature Date

_____
Print Name

Property Address: _____

Division: _____, Lot: _____ Home Phone Number: _____, Cell Phone Number: _____

Email Address: _____

Thank you for your cooperation.

1. Program Administration: The responsibility for administration of the Cross Connection Control Program rests with the Purveyor. General policy direction and risk management agreement decisions are established by the Timberlake Community Club Board of Directors.

2. The Purveyor will employ or have on staff at least one person certified by DOH as a Cross Connection Specialist to develop and implement the CCC program. As an alternative, or when no staff or employees are properly qualified, the Purveyor may retain a DOH-certified CCS on contract to provide the necessary expertise and services.

3. The following cross-connection related tasks will be performed by or under the direction of the Purveyor's certified CCS (on staff or under contract):

    - Preparation of and recommendations regarding changes to the CCC program;
    - Performance of and/or reviews of CCC hazard evaluations;
    - Recommendations on the type of backflow preventer to be installed;
    - Recommendations on schedules for retrofitting of backflow preventers;
    - Inspections of backflow preventers for proper application and installation;
    - Reviews of backflow preventer inspection and test reports;
    - Reviews of backflow testing quality control information;
    - Recommendations and/or the granting of exceptions to mandatory premises isolation;
    - Participation in or cooperation with other water utility staff in the investigation of backflow incidents and other water quality problems;
    - Completion of Backflow Incident Reports; and
    - Completion of CCC Activity and Program Summary Reports

4. The Purveyor may delegate other CCC program activities to other personnel who are not certified CCSs, including clerical support staff. These activities include:

    - Administration of paperwork associated with service agreements;
    - Mailing, collecting, and initial screening of hazard evaluation/water use questionnaires;
    - Mailing of assembly testing notices;
    - Receiving and screening of assembly testing reports;
    - CCC program database administration and record keeping;
    - Dissemination of public education material; and
    - Assisting tasks associated with coordination of the LAA.

5. The following table identified the current CCS employed or retained on contract by the Purveyor to manage the Purveyor's CCC program and/or act as the CCC technical resource for the Purveyor:

Name of CCS	**Arthur Bushey**
Address	**2880 E Timberlake Dr W**
City, State, Zip	**Shelton, WA 98584**
Telephone Number	**360-427-8928**
CCS Certification Number	**011492**

1. Inspection and Testing of Backflow Preventers

   All backflow preventers that the Purveyor relies upon for protection of the water system will be subject to inspection and, if applicable, testing.

   Inspection and testing of backflow preventers will be as follows:

   - The Purveyor's DOH-certified CCCS will inspect backflow preventers for proper application (i.e., to ensure that the preventer installed is commensurate with the assessed degree of hazard).
   - Either a DOH-certified CCS or backflow assembly tester (BAT) will perform inspections of backflow preventers for correct installation.
   - A DOH-certified backflow assembly tester will test all assemblies relied upon by the Purveyor to protect the public water system.

2. Frequency of Inspection and Testing

   Inspection and testing of backflow preventers will be conducted:

   - At the time of installation;
   - Annually after installation;
   - After a backflow incident; and
   - After repair, reinstallation, relocation, or re-plumbing.

At this time the Timberlake Community Club Water System does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the PWS's service area, the Purveyor will make all cross-connection control requirements mandated by the Permitting Authority in accordance with Chapter 90.46 RCW part of the written CCC program plan and comply with such additional requirements.

MATERIALS

M-1 DUCTILE-IRON PIPE AND FITTINGS

Ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, standard thickness, Class 52. The pipe shall be lined with cement mortar conforming to ANSI/AWWA C104/A21.4 and coated with an asphaltic coating. Each length shall be plainly marked with the manufacturer's identification, year cast, class of pipe, and weight. Type of joint shall be rubber gasket, push-on type or mechanical joint conforming to ANSI/AWWA C111/A21.11. Pacific States pipe is conditionaly approved for use on looped water systems provided the pipe has been treated for Seattle water and bears the factory "SEATTLE" stamp. Pacific States pipe shall not be installed on closed/dead end water mains within the Community.

All fittings shall be short-bodied, compact ductile iron with a minimum rating of 250 psi working pressure conforming to ANSI/AWWA C153/A21.53 except flanged fittings shall conform to ANSI/AWWA C110/A21.10. All fittings shall have a cement mortar lining conforming to ANSI/AWWA C104/A21.4. The fittings shall be furnished with flanged ends or mechanical joints as shown.

Restrained joints shall be made up with push-on joint pipe and fittings. The push-on joint restraint device shall be ductile iron with a 350 psi working pressure and shall be U.S. Pipe TR FLEX, Griffin Pipe Products Company SNAP-LOK, Pacific States Lock Joint if Pacific States pipe is allowed, or MEGALUG.

Alternatively, pipe joints may be restrained using shackle rods and pipe clamps. All shackle rods and associated materials shall be COR-TEN or corrosion resistant equal. Pipe clamps shall be "Star" or approved equal.

Solid sleeve pipe couplings shall be long pattern sleeves constructed of ductile iron with a minimum pressure rating of 250 psi working pressure.

Flexible transition couplings shall be Romac Industries, or equal.

Pipe which will not be buried, or in a vault, shall be insulated. Insulation shall be 2-inch thickness of fiberglass pipe insulation, with 0.16 stucco embossed sheet aluminum weather cover with a self-seal lap and #8 x 1/2-inch stainless steel screws on 6-inch centers. Exposed flanges shall be insulated with a removable insulation pad fabricated with 2-inch thermal insulating wool (TIW) fiberglass insulation inside of silicone-impregnated cloth and secured with lacing hooks. Submittals are required for the material intended to be used.

M-2 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (4 INCHES AND OVER)

PVC pipe 4-inches and larger shall conform to AWWA C900. Outside diameter shall be equal to ductile iron pipe and with gasket bell ends. The minimum wall thickness shall be equal to or greater than dimension ratio (DR) of 18 (150 psi) for residential service and DR 21 (200 psi) for commercial service unless otherwise specified.

Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM F477. All PVC water pipe shall be considered flexible conduit.

M-3 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE (UNDER 4 INCHES)

PVC pipe under 4-inches shall conform Conform to ASTM D2241. Pipe material shall be PVC 1120, PVC 1220 or PVC 2120. The minimum wall thickness shall be equal or greater than a standard dimension ratio (SDR) of 21 unless otherwise specified.

Pipe shall bear the National Sanitation Foundation Seal for use to transport potable water. Joints shall conform to ASTM D3139 using a restrained rubber gasket conforming to ASTM F477

M-4 FLEXIBLE COUPLINGS

Flexible couplings shall be use for connections between plain end pipe of same or different material. Sleeves shall be gray iron ASTM A126 Class B or ductile iron ASTM A536. Ends shall have a smooth inside taper for uniform gasket seating.

Followers shall be ductile iron ASTM A536 and gaskets shall be Grade 30 specially compounded rubber of all new materials. Bolts and nuts shall be high strength low alloy steel with heavy, semi-finished hexagon nuts conforming to AWWA C111 (ANSI-A21.11).

M-5 LOCATOR TAPE AND TRACER WIRE

Detectable locator tape shall consist of a minimum 4.0 mil thickness, inert polyethylene plastic which is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil, with a minimum 1/3-mil metallic foil. The tape shall be at least three inches (3") in width and shall be solid blue with identifying print in black letters. The tape shall have printed thereon the following or similar as commercially available:

"CAUTION - BURIED WATERLINE BELOW"

The identifying lettering shall be minimum 1" high and repeated continuously the full length of the tap. In no instance shall the spacing of the individual segment of the identifying message be greater than eighteen inches (18").

Detectable locator tape shall be installed 24 inches above the pipe it identifies. The backfill shall be sufficiently leveled so that the tape will be installed on a flat surface. The tape shall be centered in the trench and laid flat with printed side up. Caution shall be exercised to avoid displacement of tape and to ensure its integrity. The remainder of the trench is then backfilled in accordance with applicable specifications.

All non-metallic water main and water services shall have tracer wire installed above the pipe. Tracer wire shall consist of jacketed 12 gauge solid copper wire. Tracer wire shall be continuous from valve box to valve box and along water services from the main to the meter box. Enough slack shall be provided in each valve box or meter box to allow the wire to be extended above the ground surface. All wires shall be tested for continuity following installation and backfill.

M-6 GATE VALVES

A. Through 8-Inch Diameter

Gate valves shall conform to AWWA C509. The valves conforming to AWWA C509 shall be ductile iron-bodied, resilient-seated, nonrising stem with flanged ends or mechanical joint as shown. The operating stem shall be bronze with O-ring stem seals. The valve shall open to the left and be equipped with a 2-inch-square operating nut. Valves installed above ground shall be equipped with a hand-wheel. The resilient wedge assembly shall be fully encapsulated by the approved resilient material. Resilient seated gate valves shall be Kennedy, Clow, M&H, Mueller, or equal.

B. 10-Inch and 12-Inch Diameters

Gate valves shall conform to AWWA C509. The valves shall be ductile iron-bodied, resilient-seated, nonrising stem with flanged ends or mechanical joint as shown. The operating stem shall be bronze with O-ring stem seals. The valve shall open to the left and be equipped with a 2-inch-square operating nut. Valves installed above ground shall be equipped with a hand-wheel. The resilient wedge assembly shall be fully encapsulated by the approved resilient material. Resilient seated gate valves shall be Kennedy, Clow, M&H, Mueller, or equal.

M-9 BUTTERFLY VALVES

All valves larger than 12 inches shall be butterfly valves.

Butterfly valves shall conform to AWWA C-504. The valves shall be short-body type, Class 150B, suitable for direct burial installation. The valves shall have no moving bearing or contact surfaces of iron in contact with iron. Contact surfaces shall be machined and finished in the best workmanlike manner, and all wearing surfaces shall be easily renewable.

The valve operators shall be manual, fully enclosed, and suitable for buried service. The valve shall open to the left and be equipped with a two-inch-square operating nut.

M-10 TAPPING TEE AND TAPPING VALVE

Tapping Tee shall be furnished with flanged inlet end connections having a machined projection on the flanges to mate with a machined recess on the outlet flanges of the tapping sleeves and crosses. Outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint connections, except that the outside of the hub shall have a large flange for attaching a drilling machine.

Seat opening of the valves shall be larger than normal size to permit full diameter cuts. Tapping sleeves shall be ductile iron, stainless steel, epoxy-coated steel, or other approved materials.

M-11 VALVE BOXES

The valve boxes shall be adjustable two-piece cast-iron valve box of 5 inches minimum inside diameter. The top section shall be 18 inches minimum length with a valve cover marked "WATER" as manufactured by Rich Manufacturing Company, Series 940, or equal. Lids shall be short skirted, 3-inch maximum total depth if tapered and 2-inch maximum total depth if straight. See Detail 12.

M-12 VALVE STEM EXTENSIONS

Provide stem extension with standard operating nut and self-centering rockplate support for all valves with operating nut more than 4 feet below grade to raise operating nut to within 36 inches of the ground surface.

M-13 VALVE MARKER POSTS

The marker posts shall be concrete with 4 inches minimum square section, 42 inches long, and shall be reinforced with at least one #3 bar of reinforcing steel. Paint exposed portion of the marker posts with two (2) coats of concrete paint in a color selected by the Community. Stencil the size of the valve and the distance in

feet and inches to the valve on the face of the post, using black paint and a stencil which will produce letters 2 inches high. See Detail 2.

M-14 FIRE HYDRANTS

Fire hydrants shall be a breakaway type and shall conform to AWWA C502. The fire hydrants shall be furnished with a 6-inch mechanical joint inlet connection, 1-1/4-inch pentagon operating nut opening to the left, positive acting drain valve, and shall include extensions, if necessary, for the depth of cover on the main at each installation.

Hydrants shall have a minimum main valve opening of 5-1/4 inches, two 2-1/2-inch hose nozzles and one 4 ½ inch pumper nozzle with threads in accordance with the Community Standards.

All nozzles shall be fitted with cast iron threaded caps with operating nuts of the same design and proportions as the hydrant stem nuts. Caps shall be threaded to fit the corresponding nozzles and shall be fitted with suitable neoprene gaskets for positive water tightness under test pressures.

Hydrants shall be painted with two coats of paint to match the Community's existing hydrants or current color used by Community. The Developer shall furnish the location of the nearest point at which replacement working parts are stocked. Hydrants shall be as manufactured by Clow Model 2500 or equal. See Detail 1.

M-15 FIRE HYDRANT GUARD POSTS

The guard posts shall be precast reinforced concrete 9 inches in diameter by six feet long constructed with concrete having minimum strength of 3500 psi. Reinforcing shall consist of minimum of five No. 3 deformed steel bars. See Detail 2.

M-16 PAINT FOR FIRE HYDRANT AND POSTS

The following paints shall be used for the fire hydrants, valve lids, and posts.

Item	Paint	Color
Hydrant and Valve Lids and B.O. Hydrant	Preservative Paint Luxlite #655 Industrial & Equip. Enamel	Safety Yellow

Item	Paint	Color
Valve Marker Hydrant Guard Posts	Preservative Paint Luxlite #655 Industrial & Equip. Enamel	Safety Yellow
2" Notations for Hydrants and Valves and all Marker Posts	2" die-cut adhesive numbers and letters by EMED Co., P.O. Box 369, Buffalo, NY 14240-0369 (Ph. 1-800-442-3633) (item No. DKVL-Z, color: black)	

M-17 AIR AND VACUUM RELIEF ASSEMBLIES

The materials for the air and vacuum relief assemblies shall be as shown on the standard detail. Air relief valves shall be designed to operate with potable water under pressure to allow entrapped air to escape from the pipeline. Body and cover shall be cast iron conforming to ASTM A48, Class 30. Floats shall be stainless steel conforming to ASTM A240 and designed to withstand 1,000 psi pressure. Seats shall be Buna N rubber and internal parts shall be stainless steel or bronze.

Valves shall be designed to withstand 300 psi pressure with normal operating pressure under 100 psi and shall be manufactured by APCO or equivalent.

Vaults for air and vacuum relief valves shall be precast concrete meter box or utility vault with traffic rated cover as indicated in the standard detail.

M-18 BLOW-OFF ASSEMBLY

The materials for the blow-off assembly shall be as shown on the standard detail. Assemblies shall have two and one-half inch (2-1/2) NST nozzle. The hydrant shall have full drainage capabilities to prevent freezing after flushing. All moving parts shall be enclosed and made from high quality brass. The model used shall be suitable for underground installation.

M-19 CUSTOMER SERVICE CONNECTION

The materials for service connection installations shall be as shown on the standard details and as further described herein.

WATER SERVICE PIPE:

A. Compression Couplings:

Compression couplings for use in connecting plain end water service pipes shall be applicable for the type of pipe being coupled. Compression couplings shall have armored gaskets when similar metal pipes are being joined.

B. Insulating Couplings:

Insulating couplings shall be required at any point of connection of two dissimilar metallic pipes (i.e., copper to galvanized iron or steel).

WATER SERVICE MATERIALS

A. Saddles:

1. PVC Mains: Pipe saddles shall be Romac stainless steel band or equal as approved by the Community.
2. All other Mains: Saddles shall be bronze or ductile iron, suitable for installation on the type and class of pipe being used. Bands shall be flattened and properly formed to fit the outside diameter of the pipe. Bands, bolts, and nuts shall be hot-dip or electro-galvanized.
3. Double bands shall be used on 1" taps or larger.

B. Corporation Stops:

1. Conform to AWWA C800.
2. Corporation stops for use with saddles shall be or bronze alloy with inlet I.P. standard thread and outlet thread compatible with connection piping with no special adapters.
3. Corporation stops for direct tapping shall be bronze alloy with AWWA tapered thread inlet and outlet thread compatible with connecting pipe without special adapters.
4. Corporation stops shall be Ford, Mueller, or equal as approved by the Community.

C. Meter Setter

Meter setters shall be Ford Meter Setters with check valve included.

A. Water Meters

All meters shall be supplied by the Community.

E. Service Valve

Service Valve shall be Ford 1-inch IPS or equal, FIP x FIP Ford B-44 brass ball valve.

M-20 FOUNDATION GRAVEL

At least two basic trench-bottom conditions commonly cause problems: (1) where silty soils or fine sandy soils are encountered, they will usually flow in the presence of a stream of water, and (2) where clays, peats, or other soft materials are encountered, they may become saturated with water, but do not usually break down into fine particles and flow as do the silts or sands mentioned above.

Where Condition (1) is encountered, the following foundation gravel has been found by experience usually to be adequate. Foundation gravel shall consist of clean bank run sand and gravel, free from dirt, roots, topsoil, and debris and contain not less than 35% retained on a 1/4-inch sieve and with all stones larger than two (2) inches removed. Such gravel must only be used in a dry-trench bottom, free from quicksand or running sand.

Where Condition (2) is encountered, Class A or Class B foundation gravel listed below, has been found by experience usually to be adequate. Other material may be found to be more desirable.

Sieve Size Square Opening	Class A % Passing	Class B % Passing
2-1/2"	98 - 100	95 - 100
2"	92 - 100	75 - 100
1-1/2"	72 - 87	30 - 60
1-1/4"	58 - 75	0 - 15
3/4"	27 - 47	0 - 1
3/8"	3 - 14	---
No. 4	0 - 1	---

Foundation gravel shall contain no pieces larger than five (5) inches, measured along the line of greatest dimension.

M-21 GRAVEL BACKFILL

The gravel backfill shall consist of naturally occurring or screened gravel. It shall be essentially free from wood, roots, bark, or other extraneous or objectionable material. It shall have such characteristics of size and shape that it will compact readily to a firm, stable course.

The gravel backfill shall have such characteristics of size and shape that it will compact readily and shall meet the following test requirements:

Stabilometer "R" Value	72 min.
Swell Pressure	0.3 psi max.
Maximum Particle Size	3 in.
Passing 1/4" Sq. Opening	25% min.
Passing No. 200 Sieve	10% max.
All percentages are by weight	
Dust Ratio: % Passing No. 200 Sieve / % Passing No. 40 Sieve	2/3 max.
Sand Equivalent (ASTM D2419)	30 min.

Gravel backfill material retained on a 1/4-inch-square sieve shall contain not more than 0.20 percent by weight of wood waste.

M-22 GRAVEL BEDDING MATERIAL

Bedding for Rigid Conduits: Bedding material shall consist of clean, granular, well graded screened or crushed sand and gravel material conforming to the following gradation when tested in accordance with ASTM D422:

Sieve Size Square Opening	Percent Passing By Weight
3/4 inch	100
3/8 inch	95 - 100
No. 8	0 - 10
No. 200	0 – 3

Bedding for Flexible Conduits: Bedding material shall be a clean screened or crushed sand/gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D422:

Sieve Size Square Opening	Percent Passing By Weight
3/4 inch	100
3/8 inch	70 - 100

No. 4	55 - 100
No. 10	35 - 95
No. 20	20 - 80
No. 40	10 - 55
No. 100	0 - 10
No. 200	0 – 3

Minimum sand equivalent shall be 35 in accordance with ASTM D2419.

M-23 NATIVE MATERIAL

Native material shall be selected soil free from roots or other organic material, debris, or frozen material. Material shall be maximum size of 6 inches with no stone larger than 4 inches in the upper 6 inches of fill. Material shall be free of excess moisture and shall be processed to uniform measure and texture necessary to obtain specified density.

Native material used for trench backfill shall meet compaction requirements as specified. Native material which does not meet compaction requirements will be removed and replaced with gravel backfill.

M-24 CRUSHED SURFACING

Crushed surfacing shall be manufactured from ledge rock, talus, or gravel. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material and shall meet the following test requirements:

Los Angeles Wear, 500 Rev.	35% Max.
Degradation Factor - Top Course	25% Min.

Crushed surfacing of the various classes shall meet the following requirements for grading and quality:

Top Course	
% passing 5/8-inch-square sieve	100
% passing 1/4-inch-square sieve	55 to 75
% passing No. 40 sieve	8 to 24
% passing No. 200 sieve	10.0 max.
% fracture	75 min.
All percentages are by weight.	
Sand equivalent	40 min.

The fracture requirement shall be at least one mechanically fractured face and will apply to material retained on each sieve size No. 10 and above if that sieve retains more than 5 percent of the total sample.

The portion of crushed surfacing retained on a 1/4-inch-square sieve shall not contain more than 0.15 percent wood waste.

M-25 CONTROLLED DENSITY FILL (CDF)

CDF shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures proportioned to provide a non-segregating, self-consolidating and free-flowing material which will result in a hardened, dense, non-settling and excavatable fill. CDF shall be used as fill above utilities wherever non-settling backfill is required or as a hydraulic barrier between coarse and fine grained soil.

CDF shall be a mixture of Portland cement, fly ash, aggregates, water, and admixtures which have been batched and mixed in accordance with Section 6-02.3 of the WSDOT/APWA Specifications. Materials are as follows:.

1. Portland Cement	AASHTO M 85 OR WSDOT/APWA 9-01
2. Fly Ash	Class F
3. Aggregates	WSDOT/APWA 9-03.1(2)B
4. Water	WSDOT/APWA 9-25
5. Admixtures	WSDOT/APWA 9-23.6

CDF shall be used in the following proportions for one cubic yard. Batch weights may vary depending on specific weights of aggregates.

• Max. gallons of Mixing Water per cubic yard	50
• Lbs. of Cement per cubic yard	50
• Lbs. of Fly Ash per cubic yard	250
• Lbs. of Dry Aggregate per cubic yard, Class 1 or 2 Sand as per WSDOT/APWA 9-03.1(2)B	3200

CDF shall be batched to provide a flowing, non-segregating mix, with a slump between 6" to 8".

M-26 ASPHALT CONCRETE

Asphalt concrete shall conform to the requirements of the local agency having jurisdiction. At a minimum, asphalt concrete shall be Class B asphalt concrete and shall conform to Section 5.04 of the 1994 Standard Specifications for Road, Bridge, and Municipal Construction. The paving asphalt shall be viscosity grade AR 4000W.

Asphalt sealer for tacking joints shall be SS-1 emulsified asphalt.

Asphalt sealer for sealing joints shall be AR-4000.

M-27 SEED

The seed mixture for restoration of unimproved areas shall have the following composition, proportion and quality:

Kind and Variety of Seed in Mixture	% by Weight	Min. % of Pure Seed	Min. % of Germination
Colonial Bent Grass: (Highland or Astoria)	10%	9.8%	85%
Creeping Red Fescue: (Illahee Rainier or Pennlawn)	40%	39.2%	90%
Perennial Rye Grass:		30%	29.4% 90%
White Clover: (Preinoculated)	20%	19.6%	90%

Maximum Percentage of Weed Seed: 1.0%
Maximum Inert and Other Crops: 1.0%

M-28 FERTILIZER

The fertilizer shall be a standard commercial grade of inorganic fertilizer with 10/20/20 mix of nitrate, phosphate and potash.

M-29 MULCH

Wood cellulose fiber mulch shall be specially processed wood fiber containing no growth or germination inhibiting factors and shall be dyed a suitable color to facilitate inspection of the placement of the material. It shall be manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form a homogenous slurry.

When hydraulically sprayed on the ground, the material shall allow the absorption and percolation of moisture.

M-30 PRESSURE REDUCING STATION

A. PRECAST CONCRETE UTILITY VAULT

The vault shall be constructed of reinforced concrete with a minimum strength of 4500 psi at 28 days. The vault including joints and pipe penetrations shall be totally watertight and shall show no evidence of seepage or damp spots. Interior walls and ceiling finish of the concrete shall be smooth, hard and uniform texture. Finish shall be removed and ground smooth. Tie holes and defects larger than 1/8-inch shall be neatly patched with mortar. Floor finish shall be hand steel trowel and lightly brushed to produce a nonslip texture. Floor shall be sloped to drain to the sump. All walls, floor, ceiling, hatch and joints shall be water-tight and not leak. Ceiling and walls shall be painted as described in FINISHES.

The vault shall be furnished with an aluminum ladder. All aluminum and dissimilar metals shall be insulated from each other.

The vault shall be furnished with a continuous sump. The drain from the sump shall be removable, and installed to be one inch (1") higher than the floor of the sump to minimize silting of the drain line.

The precast vault shall be Utility Vault Co. or approved equal.

B. PIPE AND FITTINGS

The pipe and fittings shall be as specified in Ductile Iron Pipe and Fittings, except flanged pipe shall be ductile iron ANSI/AWWA C151/A21.51, standard thickness, Class 53.

Adjustable flanges to adapt to plain end pipe shall be Series 400 manufactured by Uni-Flange Corporation, or approved equal. Adjustable flanges shall only be allowed inside of the station.

Pipe supports shall be adjustable saddle supports with cast iron saddle, locknut nipple and cast-iron reducer. The pipe hangers shall include an adjustable wrought iron ring and hanging rods. The pipe supports and pipe hanger assemblies shall be Stand-on or approved equal.

C. PVC DRAIN PIPE

Polyvinyl chloride (PVC) drain pipe shall be in accordance with WSDOT Section 9-05.1(5). Pipe shall be 4 inches in diameter. A metallic location "tracer" wire shall be wrapped around the drain pipe. Connect drain line to storm pipe or drainage ditch in a manner which is protected from damage and which will not back up into the vault when the pipe/ditch is full. Install flapper-type check valve, if necessary.

D. VALVES

The gate valves shall be as specified in Gate Valves, with hand wheels and nonrising stems.

The pressure-reducing valves shall maintain constant downstream pressure regardless of varying inlet pressure. The valves shall be a hydraulically operated, diaphragm-actuated globe valve. The main body shall be cast iron with stainless steel seats, stainless steel trim and the pilot control system shall be cast bronze with stainless steel trim. The valves shall include position indicator, flow clean strainer, and shut-off cocks.

The pressure-reducing valves shall be manufactured by Cla-Val Co. or approved equal.

The pressure relief valve shall maintain constant upstream pressure by bypassing or relieving excess pressure, and shall maintain close pressure limits without causing surges. The valve shall be a hydraulically operated, diaphragm-actuated angle globe valve. The main body shall be cast iron with stainless steel seats, stainless steel trim, and the pilot control system shall be cast bronze with stainless steel trim. Pilot control piping shall face away from the wall and be easily accessible for maintenance and repair. The valves shall be flanged and include position indicator, shut-off cocks and flow control.

The pressure relief valve shall be manufactured by Cla-Val Co, or approved equal.

E. VALVE MARKER POSTS

Valve marker posts, as described in item M-12 of MATERIALS, shall be installed for all pressure-reducing valve stations, and labeled as "PRV" and the station number, using 2-inch letters.

F. ACCESS DOORS

Door leaf shall be aluminum diamond pattern to withstand H-20 wheel loadings. Channel frame shall be 1/4-inch aluminum with an anchor flanged

around the perimeter. Doors shall be equipped with stainless steel hinges, pins, spring operators for easy operation and protection against slamming, and an automatic hold-open arm with release handle. A snap lock with removable handle shall be provided. A 1-1/2-inch drainage coupling shall be located in the front right corner of the channel frame. Drainage shall be directed to the inside of the structure through 1-1/2-inch pipe or as directed by the Engineer. Hardware shall be stainless steel and mill finish shall be bituminous coating applied to the exterior of the frame. Manufacturer shall guarantee against defects in material or workmanship for a period of five years. Access door shall be Type J as manufactured by The Bilco Co., or equal.

G. DEHUMIDIFIER

The dehumidifier shall be a EBAC hot gas exchange dehumidifier (model CD30), appropriately sized and wall-mounted in the station a minimum of 6 feet from the sump. Power shall be from available electrical outlet, installed to serve the unit. A drain line shall be installed from the dehumidifier to the sump.

H. ELECTRICAL (GENERAL)

All electrical work shall conform to the latest edition of the National Electrical Code.

All electrical outlets shall have ground fault interrupt protection.

I. LIGHTS

Ceiling lights shall be 4' FRS enclosed and gasketed nonmetallic florescent luminaires with clear molded acrylic plastic lens, suitable for wet and damp locations. Lamps shall be cool white fluorescent lamps by same manufacturer. Ballasts shall be cold weather, high-power factor-type in accordance with ANSI C82.1. Lights shall automatically come on when access door is opened, and shall include a manual override to allow operation with door closed.

J. CONDUITS (ELECTRICAL/TELEPHONE)

All conduits shall be noncorrosive and shall be sealed water-tight and protected from moisture. A pull cord shall be installed of permanent material and sufficient strength to pull any cable through the conduit. Conduits shall be oversized to accommodate future wires, cables or condition.

K. GAUGES

The pressure gauges shall be as manufactured by 3D Instruments, Model #25502-XX-B11, 2-1/2-inch diameter, with brass socket and oil filled. The pressure range shall be as shown on the Drawings. The pressure gauges shall be furnished with isolation cocks, to allow for replacement or removal, a pressure equalizing snubber, and stainless steel piping. (Gauges are not to be installed prior to pressure testing.)

L. AIR VENT

All stations shall be vented to the atmosphere by a protected pipe sufficient to allow air movement, and screened against birds, bugs and foreign objects.

M. FINISHES

Surface	**Finish**	**Preparation**	**Color**
Interior walls and ceiling	One coat TNEMEC Series 66, Hi-Build Epoxoline, 4 to 6 mils dry film thickness.	Concrete cured for 28 days, clean and dry with no contaminants.	White (AA90)
	and		
	One coat TNEMEC Series 73, Endura-Shield III, 3-5 mils dry film thickness.	Clean and dry	White (AA90)
Exposed water main and valves (excluding pilot controls on control valves)	Two coats TNEMEC Series 66, Hi-Build Epoxoline, 4-6 mils dry film thickness per coat.	Equal to commercial blast cleaning (SP6)	Safety blue

Alternatives may be allowed with prior approval.

N. MISCELLANEOUS

The Timberlake Community retains the right to require such other safety or functional items as may be necessary to provide for the proper operation of the station.

O. OPERATION AND MAINTENANCE MANUALS

The Developer shall furnish three bound copies of operation and maintenance data for the pressure relief and pressure reducing valves.

The data shall be bound in heavy, permanent type binders and shall be indexed so that information on any piece of equipment can be easily found.

These manuals shall include:

1. Assembly and disassembly instructions.

2. Parts list with diagrams and cut-away sections.

3. Operating and maintenance instructions for equipment along with recommendations for preventive maintenance.

4. Equipment specifications and guaranteed performance data.

5. Name, address, telephone number of manufacturers, vendors and spare parts sources.

6. Manufacturers' warranties.

7. Step-by-step start-up and operating procedures.

8. Factory parts listed with listings of all component sources, original manufacturer's part number, and interchangeability listings.

9. Lubrication charts.

10. Wiring diagrams of all control circuits actually supplied.

P. START-UP TESTING

The Developer shall furnish a proposed testing and start-up schedule and procedure to the Community Engineer a minimum of three (3) weeks prior to such testing. A factory representative may be required to be present for some equipment. Sufficient tools and supplies shall be furnished to maintain isolation from the Community system until approved for permanent connection and operation.

CONSTRUCTION METHODS

CM-1 CLEARING AND GRUBBING

Clearing, grubbing, and grading where required shall be performed within the public right of way or easements as permitted by the governing agencies or property owners. Construction work in forested and native unimproved areas shall be conducted with extra precaution. Construction activity, stored materials and piles of earth shall not extend beyond the designated work limits. Trees and foliage which are not to be removed in construction shall be protected. Finish grades after completion shall match original grades, sloped to prevent ponding. Remove any surplus dirt or over burden piled around trees to prevent future damage; remove such material by hand if necessary. Clear and fell trees with sufficient care to prevent damage.

All trees which are removed by the Developer shall become the property of the Developer and shall become the Developer's responsibility to remove from the site, unless otherwise noted in the easement stipulations or elsewhere in these specifications. Removal of clearing and grubbing debris shall be subject to the approval of the Community and shall in no way constitute a hazard to the continuous operation of any existing utilities.

All clearing and grubbing debris shall be disposed of by hauling to a site selected and obtained by the Developer and approved by Island County.

CM-2 TRENCH EXCAVATION AND BACKFILL

Trench excavation shall be unclassified. The terms earthwork or excavation include all materials excavated or removed regardless of material characteristics. The Developer shall estimate the kind and extent of materials which will be encountered in the excavation.

All trenches shall be dug to true line and smooth bottom grades. Surface grading, including cut, fill and compaction, shall be accomplished prior to trench excavation. In pavement sections, grading to subgrade may be sufficient for areas to be newly paved. The trench width from the bottom of the trench to the crown of the pipe shall not exceed 40 inches for 15-inch-diameter and smaller pipe. For 18-inch-diameter or larger pipe, the trench width from the bottom of the trench to the crown of the pipe shall not exceed 1.5 times the inside diameter of plus 18 inches. If these widths are exceeded, a stronger grade of pipe and/or a higher classification and amount of bedding material shall be furnished, as directed by the Community.

Minimum cover over all water lines shall be 36 inches over the top of the pipe. Maximum cover shall be 6 feet, unless otherwise authorized by the Timberlake Community. Deeper excavation may be required due to localized breaks in grade, or installing the new main under existing culverts or other utilities where necessary.

Where it is necessary to cross sanitary sewer or storm sewer trenches, all trench backfill shall be removed and replaced with mechanically compacted granular material to provide a uniform support for the full length of the pipe.

The Washington State Department of Health and the Washington State Department of Ecology require a 10-foot horizontal separation between all sanitary sewer lines and water lines. A five-foot minimum horizontal separation shall be maintained between all water facilities and underground power, gas and telephone facilities, unless otherwise approved.

The root systems of all trees not to be removed which are located on or near the easements and right-of-way shall **not** be cut or disturbed, but shall be tunneled or otherwise protected by the Developer to ensure that no damage is done.

During trenching, installing of pipe lines and appurtenances, and the placing of backfill, trenches shall be kept free of water. The Developer shall furnish all equipment necessary to dewater the trench and shall dispose of the water in such a manner as not to cause a nuisance or menace to the public. All water lines, new or existing, shall be protected against the intrusion of foreign material.

When so directed by the Community, the trench shall be extended below the pipeline grades to permit the placing of foundation gravel. All areas of overexcavation, to remove unsuitable, or for any other reason, shall be brought to grade with approved foundation material, and compacted.

Maximum amount of open trench on streets shall be 300 linear feet. At the end of each day all ditches must be backfilled or covered with steel plates and barricaded with flashing warning lights to prevent people or animals from falling into the trench.

All shoring and bracing or sheeting required to perform and protect the trench and to safeguard the employees, shall be designed and furnished by the Developer. No timber bracing, lagging, sheathing or other lumber shall be left in any excavation except with the permission of the Community.

Pipe bedding and initial backfill to 12 inches over the top of the pipe shall be completed before subsequent backfilling operations are started.

The Developer shall take all necessary precautions to protect the pipe from any damage, movement or shifting. In general, backfilling shall be performed by placing the material so as not to damage the pipe.

The backfill material to be used in the trench section shall be free draining granular material free of debris and clay. This material shall be compacted by mechanical compaction to 95% of maximum density, ASTM D-698, to finished grade in all

locations, and shall be in accordance with County requirements in all County rights-of-way.

The Developer shall be responsible for providing the proper size and type of compaction equipment and selecting the proper method of utilizing said equipment to attain the required compaction density. In all cases, equipment shall be selected and used so as to not damage the pipe or other utilities and structures.

Compaction testing will be required for all backfilled trenches. A minimum of one testing location shall be chosen for each 200 feet of water main installed. A separate test shall be performed for each two (2) feet of depth. The Developer, or the Contractor, shall contract the services of a qualified and approved geotechnical consultant to perform the compaction testing. All testing (and retesting) shall be at the Developer's expense. Testing locations shall be chosen by the field inspector. Compaction results shall be furnished prior to paving. Recompaction and retesting will be required for any tests which do not pass the compaction testing. Satisfactory compaction tests do not relieve the Contractor of the responsibility to provide trenches which will not fail. Subsurface settlements within the warrantee period will remain the responsibility of the Developer.

Materials excavated from trenches are not guaranteed to be suitable to meet the standards for trench backfill. Where original excavated material is unsuitable for trench backfill, imported gravel backfill shall be placed. The unsuitable material shall be removed by the Developer to a disposal area, in accordance with County requirements.

CM-3 INSTALLATION OF WATER MAINS AND FITTINGS

The trench shall be excavated to the depth required so as to provide a uniform and continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes.

All pipe, fittings, valves and hydrants shall be carefully lowered into the trench in such a way as to prevent damage to water main materials and protective coatings and linings. Under no circumstances shall materials be dropped or dumped into trench.

Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. Pipe shall be laid with bell ends facing in the direction of laying, unless directed otherwise by the Community. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with bedding material tamped under it. No pipe shall be laid in water, or when, in the opinion of the Community, trench conditions are unsuitable. Wherever it is necessary to deflect pipe from a straight line, the amount of deflection allowed shall not exceed pipe manufacturer's recommendations for mechanical and push-on joints, and shall be approved by the Community.

For connection of push-on joint, the jointing shall be done according to manufacturer's recommendations with special care used in cleaning gasket seat to prevent any dirt or sand from getting between the gasket and pipe. Lubricant to be used on the gasket shall be nontoxic and free from contamination. When a pipe length is cut, the outer edge of the cut shall be beveled with a file to prevent injury to the gasket during jointing.

For connection of mechanical joints, the socket, plain end of each pipe and gasket shall be cleaned of dirt before jointing and shall be jointed according to manufacturer's directions. Pipe ends shall be cut square with all chamfers cut off. Bolts shall be tightened alternately at top, bottom, and sides so pressure on gasket is even.

The cutting of pipe for installing valve, fitting or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the axis of the pipe.

At times when pipe laying is not in progress, the open ends of pipe shall be closed by a water-tight plug or other means approved by the Community. If water is in the trench when work resumes, the seal shall remain in place until the trench is pumped completely dry.

CM-4 INSTALLATION OF GATE VALVES

The valves shall be accurately set at places designated on the Plans and set with the stems vertical. Adjust stuffing boxes to ensure watertightness without binding the stem. The axis of the valve box shall be common with the axis projected off the valve stem. The tops of the adjustable valve boxes shall be set to the existing or established grade, whichever is applicable.

CM-5 INSTALLATION OF BUTTERFLY VALVES

The valves shall be installed in the same manner as gate valves.

CM-6 INSTALLATION OR RELOCATION OF FIRE HYDRANTS

Hydrants shall be inspected in the field upon arrival to determine proper working order. Hydrants shall be set according to the standard detail including set plumb and to established grade utilizing hydrant extensions if necessary, to result in the center of nozzle being between 18 and 24 inches above final grade. Hydrants shall be backfilled with gravel under and around the barrel drain. The barrel shall be supported on a concrete bearing block.

Hydrants shall not be installed within three feet of a traveled roadway and a minimum 3–foot radius unobstructed working area shall be provided around all hydrants. Hydrants shall be restrained as shown in Detail 1. Shackle rods shall be cleaned and painted after installation with 2 coats of asphalt varnish, or with such other bituminous paint as may be approved by the Engineer.

The hydrant shall be painted with two coats of paint as specified in the construction materials section. When shown on the Plans or as directed by the Community, a culvert shall be installed in the roadway ditch in front of the hydrant assembly. Length and diameter shall be as specified.

Relocated fire hydrants shall meet the same requirements as new fire hydrants for grade, backfill, blocking and culverting. After relocation, the fire hydrant shall be painted like new. Relocated fire hydrants shall be subject to the same hydrostatic pressure and purity tests as new fire hydrants. See Standard Detail

CM-7 INSTALLATION OF VALVE MARKER POSTS

Valve markers shall be installed for all valves except fire hydrant valves or as directed by the Community. Valve markers shall be located at the edge of the right-or-way or at the location as directed by the Community. The markers shall be set to leave 18 inches exposed above ground. The exposed portion of the markers shall be painted with concrete primer and two coats of paint as specified in the construction materials section. The valve size and the distance to the valve, rounded off to the nearest foot, shall be painted on the marker in two-inch-high numbers. See Standard Detail 2.

CM-8 INSTALLATION OF FIRE HYDRANT GUARD POSTS

When directed by the Community, fire hydrant guard posts shall be set with the tops of the posts at the same elevation as the top of the pumper port of the hydrant. The exposed portion of the posts shall be painted with concrete primer and two coats of paint as specified in the construction materials section. See Standard Detail 2.

CM-9 INSTALLATION OF AIR-RELIEF ASSEMBLIES

The air-relief assemblies shall be installed as shown in Standard Detail 9 and at the location as directed by the Community. Locate valves so that high point of water main is vented and construct pipe between main and valve with upward slope to valve.

CM-10 INSTALLATION OF BLOW-OFF ASSEMBLIES

The blow-off assemblies shall be installed as shown in Standard Detail #8 and at the location as directed by the Community.

CM-11 INSTALLATION OF CUSTOMER SERVICES

The services shall be installed as shown on the standard details. Services shall be installed in one piece with no splices, unless approved otherwise by Clinton Water Community for special conditions. Under no circumstances will splices be allowed for polyethylene services. See Standard Detail #5

CM-12 CONCRETE THRUST BLOCKING

Concrete thrust blocking shall be cast in place and have a minimum of 1/4-square-foot bearing against the fitting and 2 square feet of bearing against undisturbed soil and shall be clear of joints so as to permit taking up or dismantling joint. All poured in place blocking shall have a minimum measurement of 12 inches between the pipe and the undisturbed bank. All blocking configurations and sizes shall be per the standard detail. All blocking as shown on the standards are considered as minimums, and consideration should be given to unusual circumstances and topography. See Standard Detail #4

CM-13 AUGERED OR BORED CASINGS

Water mains installed in casing pipe shall be made by jacking, driving, or augering a steel casing pipe beneath the surface. No open excavation shall be made closer than six feet from the edge of pavement. The diameter of the casing shall be sufficient to allow installation of the water main and also to provide allowance for adjustment of the water main to proper line and grade. Wall thickness shall be sufficient to withstand installation force and highway loading and shall not be less than 3/8-inch. After installation of the water main, and with the approval of the inspector, sand shall be placed in the casing pipe to fill all voids. Casing ends shall be sealed using linkseal, mortar, or other approved method.

Restrained mechanical joint pipe shall be installed in all casings. Approved stainless steel casing insulators (Cascade Water Works Manufacturing, or equal) shall be used to protect the pipe and adjust it to proper grade. The water main may be pushed or pulled into the casing pipe, unless MEGALUGS are used for

joint restraint, in which case the water main should be pulled into and through the casing pipe.

All bore pits or related excavations shall be closed at the end of each day. Ditches must be backfilled or covered with steel sheets and, within public or private rights-of-way, barricaded with minimum 5-feet high chain link fencing and flashing warning lights to prevent people or animals from falling into the trench.

The requirements of the roadway agency as contained in the construction permit, or as issued by oral instructions of the authorized representative of the roadway agency shall be followed by the Developer.

CM-14 HYDROSTATIC TESTING DISINFECTING

All pipelines shall be tested and disinfected prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed, and operated by the Developer. Feed for the pump shall be from a barrel or other container so that the actual amount of "makeup" water can be measured periodically during the test period.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent blocking is not required, the Developer shall furnish and install temporary blocking.

As soon as pipe is adequately secured against movement under pressure, it may be filled with water.

Water supply for filling, testing and flushing of the new mains will be available from the existing distribution system at no cost for one testing and flushing cycle. However, if water is needed for additional tests, the Developer shall be billed for water used at the current rate of the Community. High volume flushing of the system will occur after the permanent full diameter connection is made. The Developer shall obtain specific permission from the Community during the months of May through September before any high volume flushing will be allowed.

After the pipe is filled and all air expelled, it shall be pumped to a test pressure equal to 100 psi in excess of the operating pressure, and this pressure shall be maintained for a period of 1/2 hour. In accordance with manufacturer's recommendation, all valves may be limited to a pressure differential equal to the rated pressure of the valve (200 psi minimum), but shall not restrict the test pressure of the main. Mainline testing shall be made with the hydrant auxiliary gate valves open and pressure against the hydrant valve. Hydrant ports shall also be tested to hold static pressure without any visible leaks. Hydrostatic tests shall be performed on every complete section of water main between two valves.

In addition to the hydrostatic pressure test, a leakage test shall be conducted on the pipeline. The leakage test shall be conducted at the same pressure as the hydrostatic pressure test for a period of not less than 1/2 hour. The quantity of water lost from the main shall not exceed the number of gallons per hour determined by the formula:

$$L = \frac{ND(P)^{0.5}}{7,400}$$

in which L = Allowable leakage, gallons/hour
N = No. of joints in length of pipeline tested
D = Nominal diameter of the pipe in inches
P = Avg. test pressure during leakage test, psi

Defective materials or workmanship, discovered as a result of the tests, shall be replaced by the Developer at the Developer's expense. Whenever it is necessary to replace defective material or correct the workmanship, the tests shall be rerun at the Developer's expense until a satisfactory test is obtained.

As sections of pipe are constructed and before pipelines are placed in service they shall be sterilized in conformance with the requirements of the State of Washington, Department of Health.

CM-15 DISINFECTING

Before being placed in service, all new water mains and repaired portions of, or extensions to, existing mains shall be chlorinated and a satisfactory bacteriological report obtained. Temporary or permanent physical connections shall not be allowed between the existing distribution system and non-disinfected pipelines constructed without a State Department of Health approved backflow preventer (double check valve assembly or better) temporarily installed in the connecting line

Chlorine shall be applied in one of the following manners, listed in order of preference, to secure a concentration in the pipe of at least 50 ppm:

(1) Injection of chlorine-water mixture from chlorinating apparatus through corporation cock at beginning of section after pipe has been filled and with water exhausting at end of section at a rate controlled to produce the desired chlorine concentration.

(2) Injection similarly of a hypochlorite solution.

(3) Placement of calcium hypochlorite throughout pipeline as constructed in proper quantities to produce the desired dosage. Filling of pipeline with this method should be at a very slow rate. Pipeline should be filled within 2 days of placing sterilizing agent.

After the desired chlorine concentration has been obtained throughout the section of line, the water in the line shall be left standing for at least 24 hours. Following this, the line shall be thoroughly flushed and a water sample collected. The line must not be placed in service until a satisfactory bacteriological report has been received.

Discharge of hypochlorinated water to surface waters is strictly prohibited. A reducing agent shall be applied to the water to be wasted to neutralize the chlorine residual remaining in the water. Federal, state, and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water. This is to include lakes, rivers, streams, and any and all other waters where fish or other natural water life can be expected. Hypochlorinated water may be required to be trucked off site and disposed of at a sewer treatment plant or other approved location.

Community representatives only shall be allowed to operate existing and new tie-in valves. Developer's personnel are expressly forbidden to operate any valve on any section of line which has been accepted by the Community.

CM-16 FLUSHING

Upon completion of pipe laying, chlorination and pressure testing, all dirt and foreign matter shall be removed by a thorough flushing through all hydrants, blowoffs or other approved means. Each section of newly laid pipe between valves or dead ends shall be flushed independently, and fire hydrants or other dead end appurtenances shall be flushed simultaneously with the parent line. A minimum flushing velocity of 2.5 fps shall be developed in the main.

The Developer shall be responsible for scheduling and organizing his work so as to use flushing water only during off-peak hours and in the most economical manner.

No flushing shall be performed without the prior approval of the Community.

CM-17 CONNECTION TO EXISTING WATER MAIN

Wet tap connections shall be installed as shown on the Plans and the tapping valve shall remain closed.

Cut-in tees and crosses shall be installed as shown on the plans and the valves on the branches of the tee or cross shall remain closed.

At connections of new piping to existing piping all of the new piping, appurtenances and blocking shall have been installed, disinfected and tested. The contractor is required to use a state approved backflow prevention device for filling, testing and flushing of the new water system prior to cutting into the existing line.

The Community shall be notified three (3) working days in advance of all scheduled connections. No cut-in connections or connections of new piping to existing piping will be scheduled on Fridays or Mondays.

All equipment and material necessary to make the connections shall be delivered to the site prior to the start of work. Bolts, flanges, gaskets, couplings and all accessories shall be checked and assembled where possible by the Developer and verified by the Community prior to shut down of the water system. Tapping tees and valves shall be air tested prior making tap.

Before connection or cut-in, the fittings, pipes, valves, and couplings shall be cleaned and sterilized with chlorine solution in the same manner as provided for the pipeline. The cleaning and sterilizing shall be done immediately prior to installation and in the presence of the Community. Once the is started on this connection, it shall proceed continuously without interruption and as rapidly as possible until completed.

No shut-off of mains will be permitted overnight or over weekends or holidays. The Contractor may be required to perform the connection during times other than normal working hours

After connection to the existing system, the opening of valves shall be done with the authorization of, and in the presence of, the Community's authorized representative.

CM-18 ASBESTOS/CEMENT WATER PIPE

Any work to be performed upon existing asbestos/cement water pipe shall be in conformance with the latest edition of "Recommended Standard Asbestos/Cement (AC) Pipe Work Practice Procedures and Training Requirements," adopted and published by the Pacific Northwest Section of the American Water Works Association, which is included herein by reference, and Chapter 296-65 of WAC, except as revised herein. Any AC pipe which is removed from service and is not disturbed may be capped and abandoned in place. Any exposed and disturbed pipe to be removed from service shall be removed and disposed of at an appropriate waste site. The disturbed pipe may not be relocated in the trench or otherwise disposed of on site. No new or used AC pipe is to be installed in the Community. Disposal of any removed materials shall be at an approved off-site facility, in accordance with the above publications. All materials, equipment and safety gear shall be on site prior to cutting, tapping or removing any AC pipe.

CM-19 RESTORATION OF DISTURBED AREAS

Restoration of public and private improvements shall be performed by experienced contractors or by employees of the Developer who are qualified in this type of work.

The Developer shall be responsible to maintain all roadway areas until the permanent repair is accomplished.

The Developer shall limit construction time on each easement to the very minimum possible, including the time required for installation and testing. Restoration work shall follow immediately after pipe testing with due allowance for weather and season of year.

Asphalt Pavement

The existing asphalt concrete shall be cut on a neat line with a cutting disc or similar approved tool prior to excavation. Before the end of each day the trench shall be backfilled and compacted and a temporary cold mix patch shall be placed and maintained in good condition until replaced.

Immediately prior to permanent resurfacing of bituminous surfaced roads, the edges shall be retrimmed 18 inches wider than the excavation with straight vertical edges free from irregularities and the cold mix shall be removed. Edges of the trimmed surfacing shall be thoroughly tacked with an emulsified asphalt and asphalt concrete shall then be placed and compacted to the grade of the original surface. All asphalt joints shall be sealed with an approved sealer.

Crushed Surfacing

The existing gravel roadway shall be restored by grading the surface to a uniform grade to the width of the roadway prior to construction.

Where ditch sections are disturbed during construction, the ditch shall be restored to the same cross sections as existed prior to construction and shall be restored prior to placement of the crushed surfacing.

The Developer shall spread the crushed surfacing as each load is placed and shall compact the crushed surfacing after the material has been spread.

Landscaped and Improved Areas

All improvements and landscaping within the construction area which are damaged, destroyed or the use thereof interfered with due to the operation of the Developer shall be immediately restored to their former conditions by the Developer at the Developer's expense, using the services of a qualified nursery and/or sod installation company, except where noted otherwise. Notice should be given to the property owners along the route of construction by the Developer advising them of the methods to be used to preserve and restore the improvements.

Unimproved Areas

All areas disturbed by this construction for which no other restoration is specified, and for which there were no private improvements existing prior to construction, shall be seeded for erosion control.

Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untillable. Seed shall be placed at a minimum rate of 120 pounds per acre.

Seeding, fertilizing and mulching shall be installed using an approved type hydroseeder. If hand seeding is used with prior approval, evidence of vigorous growth, in the opinion of the Community, will be required prior to final acceptance.

Fertilizer shall be applied in accordance with the procedures and requirements for seeding at a minimum rate of 500 pounds per acre.

Wood cellulose fiber mulch shall be applied in accordance with the procedures and requirements for seeding at a minimum rate of 2,000 pounds per acre.

CM-20 INSTALLATION OF PRESSURE-REDUCING STATION

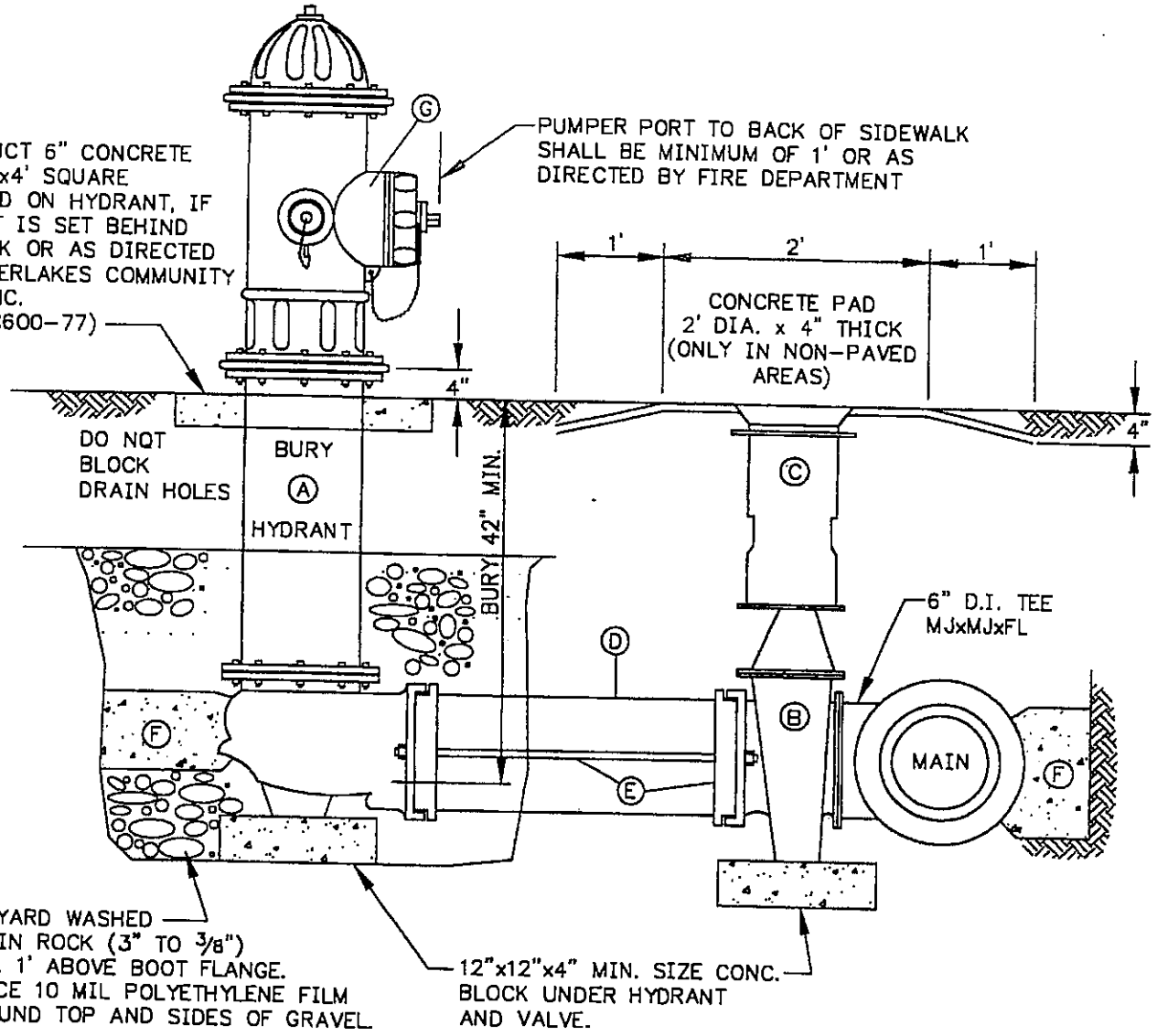
Excavation shall be carried to the proper grade and to a dense undisturbed firm foundation. Grade shall be as shown on drawings, but in no case shall the top slab extend higher than adjoining road grades. The vault shall be carefully placed on a prepared foundation of foundation gravel. The excavation shall be kept free of ground and surface water during installation. The Contractor shall use caution at all times to prevent flotation of the vault.

Backfill around the structure shall be carefully placed in layers not over 12 inches thick and mechanically compacted. No brush, topsoil, organic material or asphalt shall be used in backfilling. Where original excavated material is unsuitable for backfill, as determined by the Engineer, imported gravel backfill shall be placed. The unsuitable material shall be removed by the Contractor to a disposal site, in accordance with County requirements. The backfill shall be compacted by mechanical compactors to 95% of maximum density, ASTM D-698, to finished grade.

The piping, vault and metal items shall be painted as described under MATERIALS. All surfaces shall be clean and dry. No painting shall be done before the prepared surfaces are approved by the Engineer. The pipe shall be empty and the surfaces shall be free of all moisture and condensation before application begins.

Upon completion of the installation the Contractor shall furnish the services of a technical manufacturer's representative for the pressure relief and pressure reducing valves. The technical representative shall check the installation, test the equipment, place it in operation and train the Community's representative.

STANDARD DETAILS



A. 1-5 ¼" M.V.O. HYDRANT WITH 2-2 ½" N.S.T. AND 1-4" PUMPER PORT. TURN ADAPTER THREAD-M.J. INLET, WITH LUGS, BRASS TO BRASS SUB-SEAT.
B. 1-AUXILIARY GATE VALVE: 6" AWWA C509, RESILIENT SEAT, "O" RING STEM SEAL, M.J.xFL. WITH LUGS.
C. 1-TWO-PIECE CAST IRON VALVE BOX EQUAL TO RICH SEATTLE TYPE #045 WITH RECESSED HANDLE LID.
D. 1-6" DUCTILE IRON CLASS 52 CEMENT-LINED PIPE, LENGTH TO FIT. WHERE MORE THAN ONE LENGTH OF PIPE IS REQUIRED, CONNECT PIPES WITH MECHANICAL JOINT SLEEVE, RESTRAIN PIPE AND SLEEVE WITH MEGALUG RESTRAINERS, OR RESTRAIN PIPES WITH UNI-FLANGE SERIES 1300 & 1390 JOINT RESTRAINERS.
E. 2 - ¾" GALVANIZED STEEL SHACKLE RODS (CONNECTED WITH STAR BOLTS), TAR SEALED AFTER ASSEMBLY.
F. ¼ CY - 1:3:6: CONCRETE MIX, POUR IN PLACE TO BLOCK. MAINTAIN CLEARANCE FOR BOLTS.
G. 5" X 4" STORZ ADAPTOR WITH ALL CAPS AND CHAINS OR CABLES. ADAPTOR MATERIAL TO BE ANODIZED ALUMINUM.

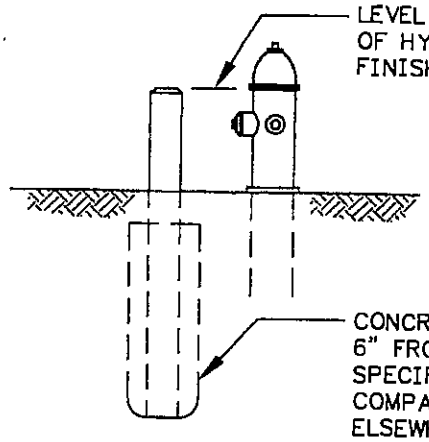
NOTES:

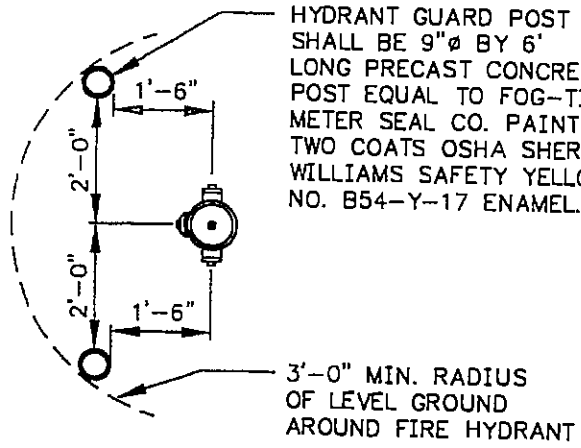
1. FIRE HYDRANT EXTENSION, IF REQUIRED.
2. FIRE HYDRANT TO BE PAINTED WITH TWO COATS OF HIGH GLOSS OSHA SAFETY YELLOW ENAMEL PAINT.

FIRE HYDRANT ASSEMBLY

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 1

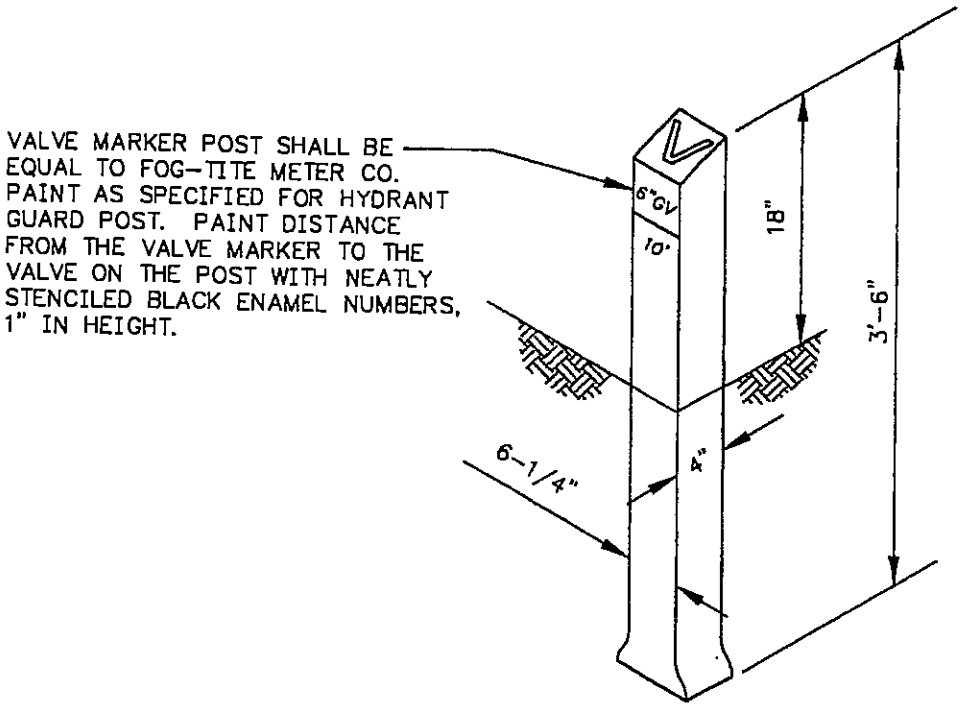
TCC-DET-01 B





ELEVATION **PLAN**

FIRE HYDRANT GUARD POST



VALVE MARKER POST

NOTES:

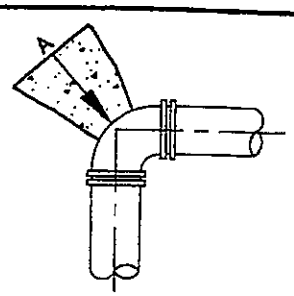
1. GUARD POSTS TO BE INSTALLED ONLY AS DIRECTED BY TIMBERLAKES COMMUNITY CLUB, INC.
2. VALVE MARKERS TO BE USED FOR BLOW OFF AND MAINLINE VALVES OUTSIDE PAVED AREAS.

FIRE HYDRANT GUARD POST AND VALVE MARKER POST

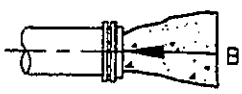
TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 2

TCC-DET-02

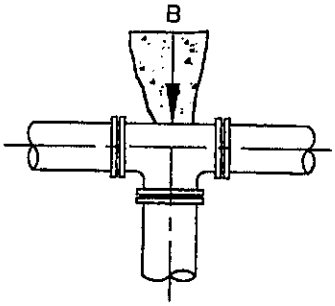
THRUST BLOCK - TABLE						
MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET						
PIPE SIZE	A	B	C	D	E	X (100 PSI)
4"	3	1	1	1	1	NONE
6"	4	4	2	1	1	NONE
8"	7	6	4	2	1	4
10"	11	10	6	3	2	6
12"	16	14	9	5	3	9
14"	22	19	12	6	3	12
16"	29	25	16	8	4	16
18"	36	31	20	10	5	20
20"	45	39	24	13	6	24
22"	54	47	29	15	8	29
24"	64	56	35	18	9	35
28"	87	76	48	24	12	48
30"	101	87	55	28	14	55
36"	145	125	78	40	20	78
42"	197	171	107	55	27	107
48"	257	223	140	71	36	140



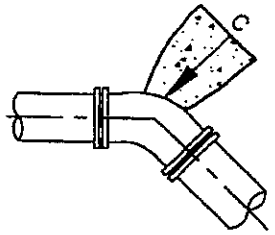
90° BEND



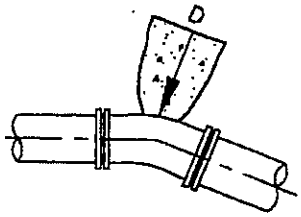
CAP



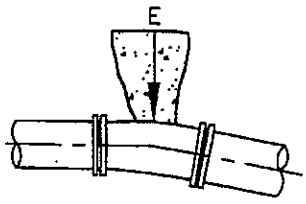
TEE



45° BEND



22 1/2° BEND

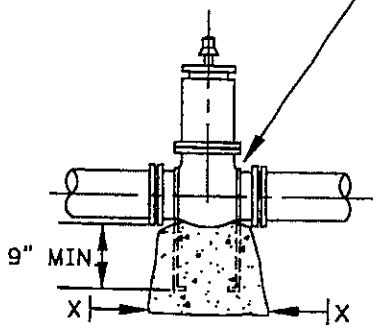


11 1/4° BEND

NOTES:

1. BEARING AREA CONCRETE THRUST-BLOCK BASED ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES & SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE & HAVE MINIMUM OF 1¼ SQUARE FOOT BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY & SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. CONTRACTOR TO PROVIDE 4 MIL MIN. THICKNESS POLYETHYLENE SHEET BETWEEN CONCRETE BLOCK AND FITTING.

2 – ½" DIA. RODS FOR 10" SIZE & SMALLER
2 – 1" DIA. RODS LARGER THAN 10" SIZE



GATE VALVE

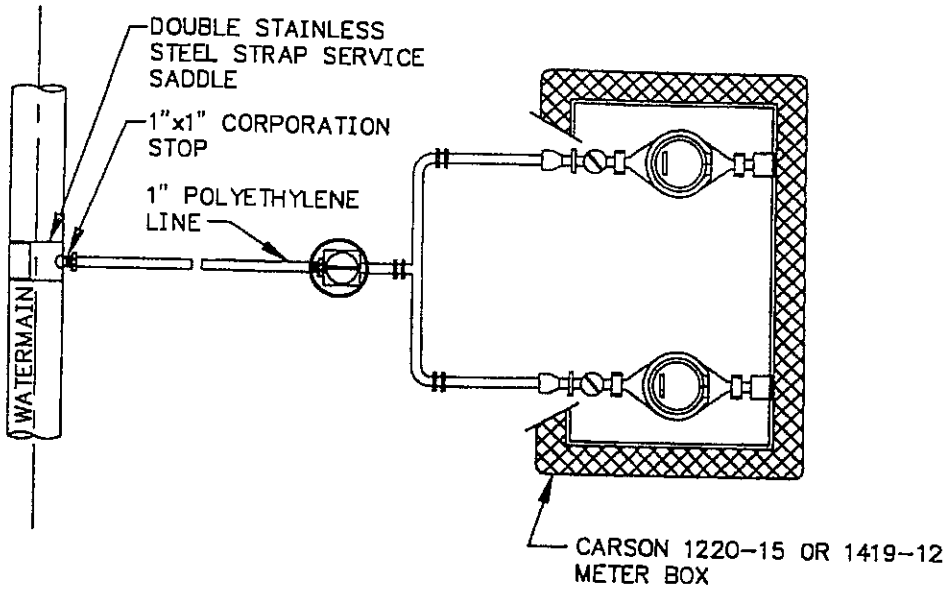
NOTES:
ADDITIONAL BLOCKING MUST BE PROVIDED IF GATE VALVE IS AT END OF LINE DURING TESTING.

CONCRETE BLOCKING

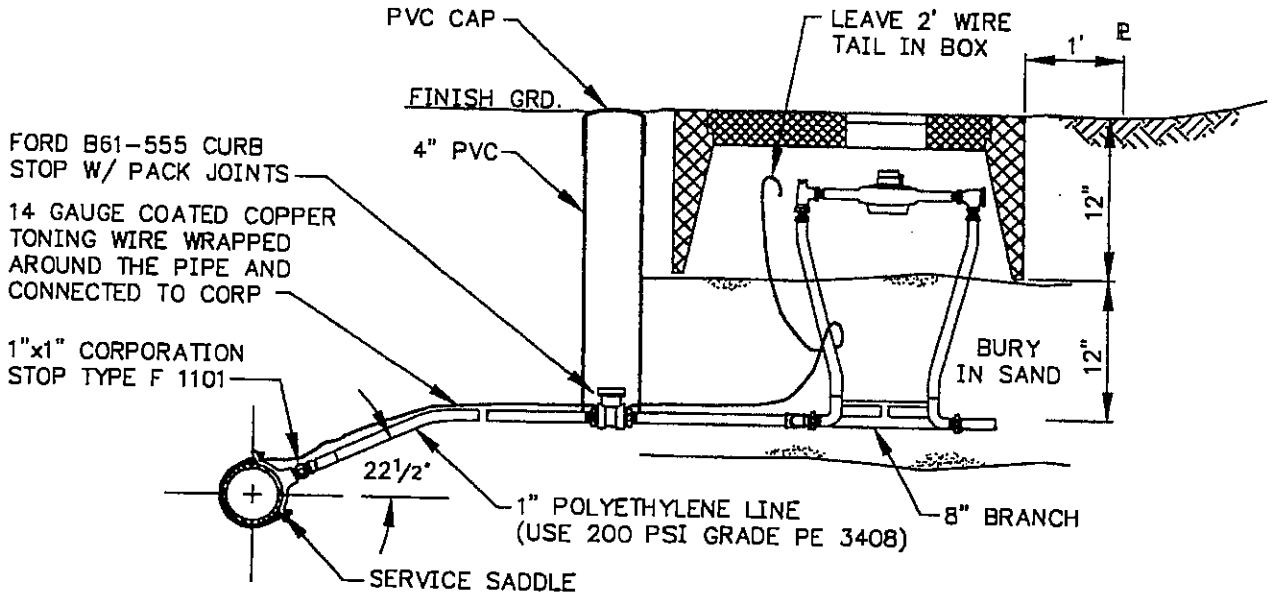
TIMBERLAKES COMMUNITY CLUB, INC.
WATER SYSTEM

SHEET 3

TCC-DET-03



PLAN



ELEVATION

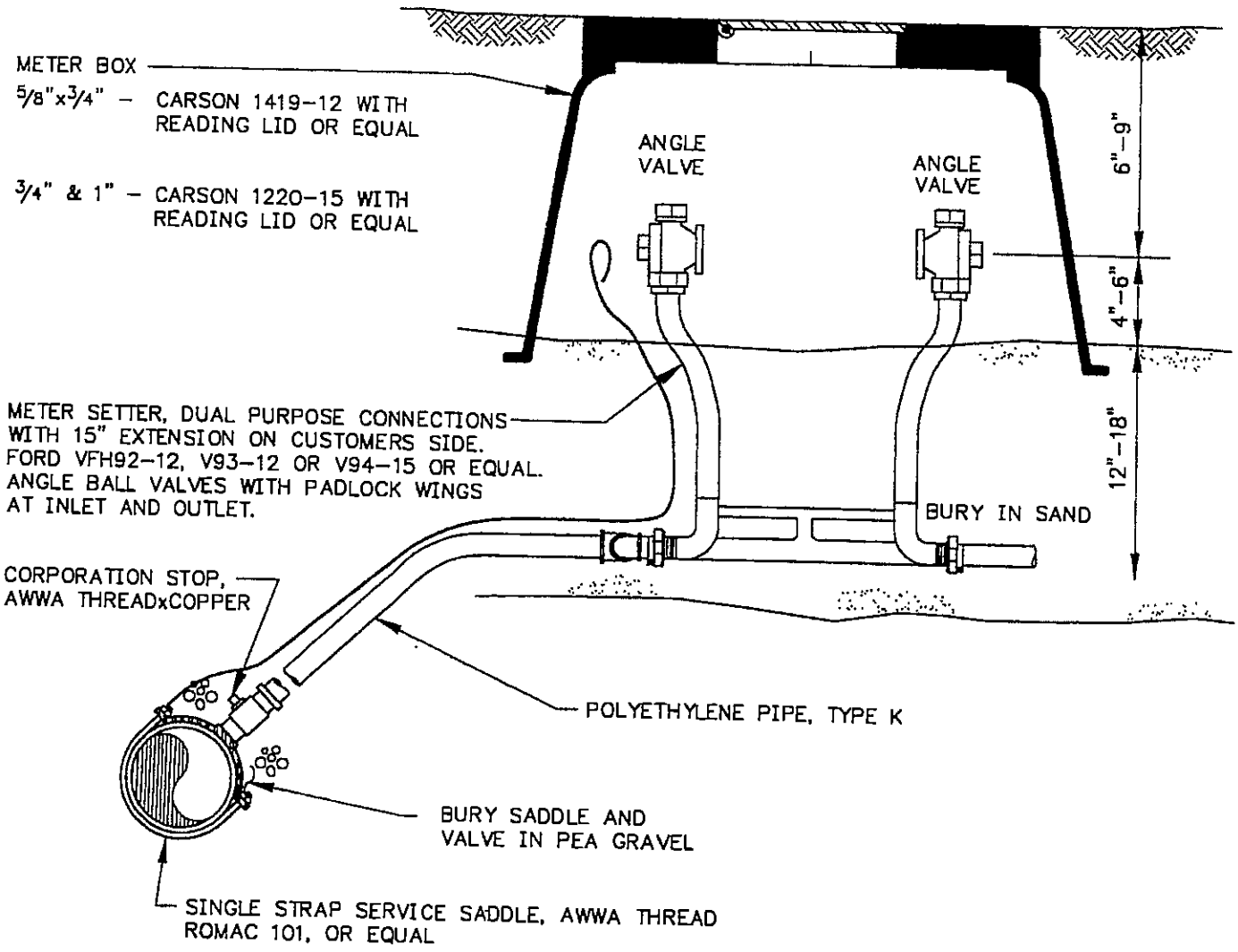
NOTES:

1. STAINLESS STEEL INSERTS REQUIRED FOR ALL PACK JOINTS
2. ALL SERVICE SADDLES SHALL HAVE RUBBER GASKET AND I.P. THREADS
3. WATER METER SHALL BE SUPPLIED AND INSTALLED BY THE WATER SYSTEM OWNER

3/4" - 1" DUAL METER SERVICE

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 4

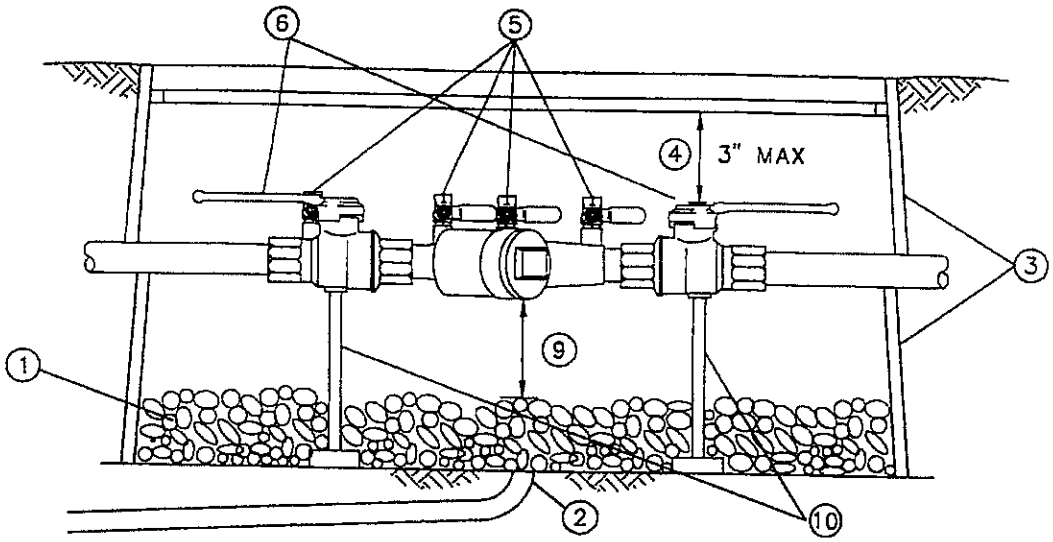
TCC-DET-04



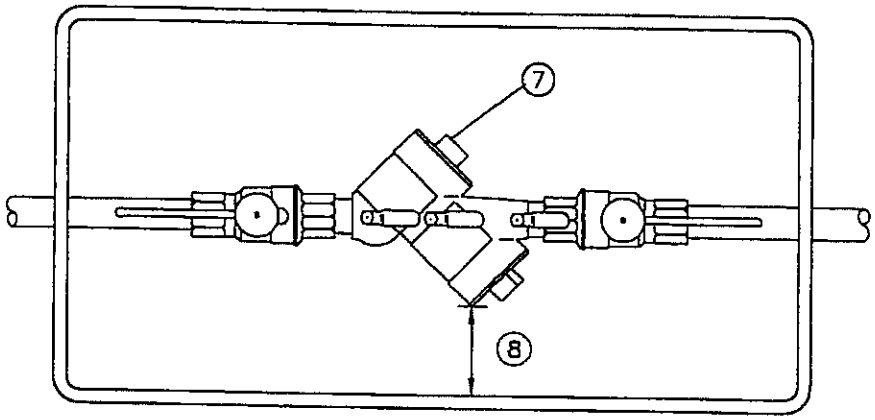
3/4" WATER SERVICE

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 5

TCC-DET-05



SECTION



PLAN

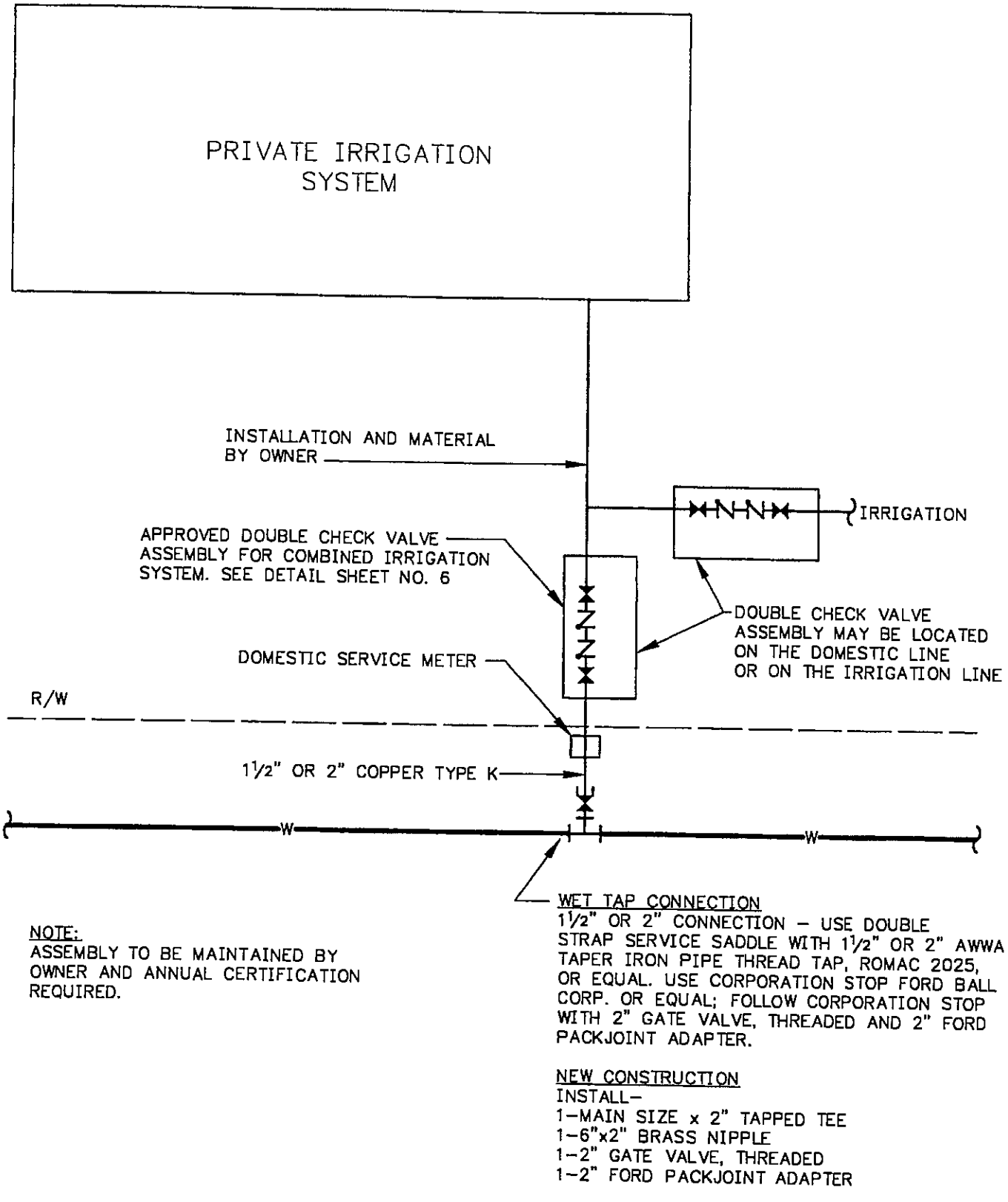
(*) INSTALL ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
(1) 1" ROUND WASHED GRAVEL BY 6" DEEP ON BOTTOM OF BOX OR
(2) DRAIN TO DAY LIGHT
(3) ENCLOSE 2" & SMALLER D.C.V.A. IN FOG TITE VAULT NO. 25 OR EQUAL. MUST HAVE REMOVABLE COVER.
(4) MAXIMUM OF 3" DISTANCE BETWEEN UNDERSIDE OF LID AND HIGHEST POINT OF DEVICE.
(5) MUST INCLUDE (4) RESILIENT SEATED TESTCOCKS WITH PLUGS VALVES.
(6) THE D.C.V.A. MUST INCLUDE (2) RESILIENT SEATED SHUT-OFF VALVES.
(7) Y-PATTERN D.C.V.A. SHOULD BE INSTALLED ON SIDE.
(8) WHEN TESTCOCKS ARE FACING SIDEWAYS THERE MUST BE A 6" MIN. CLEARENCE BETWEEN THEM AND SIDE OF BOX.
(9) MIN. OF 12" BETWEEN LOWEST POINT OF DEVICE AND DRAIN ROCK.
(10) PROVIDE SUPPORT FOR 2" DEVICES.

(*) OWNER MUST TEST AND CERTIFY PRIOR TO USE.

2" OR SMALLER FIRE SPRINKLER/IRRIGATION DOUBLE CHECK VALVE ASSEMBLY

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 6

TWA-DET-05



NOTE:
ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION REQUIRED.

WET TAP CONNECTION
1½" OR 2" CONNECTION – USE DOUBLE STRAP SERVICE SADDLE WITH 1½" OR 2" AWWA TAPER IRON PIPE THREAD TAP, ROMAC 2025, OR EQUAL. USE CORPORATION STOP FORD BALL CORP. OR EQUAL; FOLLOW CORPORATION STOP WITH 2" GATE VALVE, THREADED AND 2" FORD PACKJOINT ADAPTER.

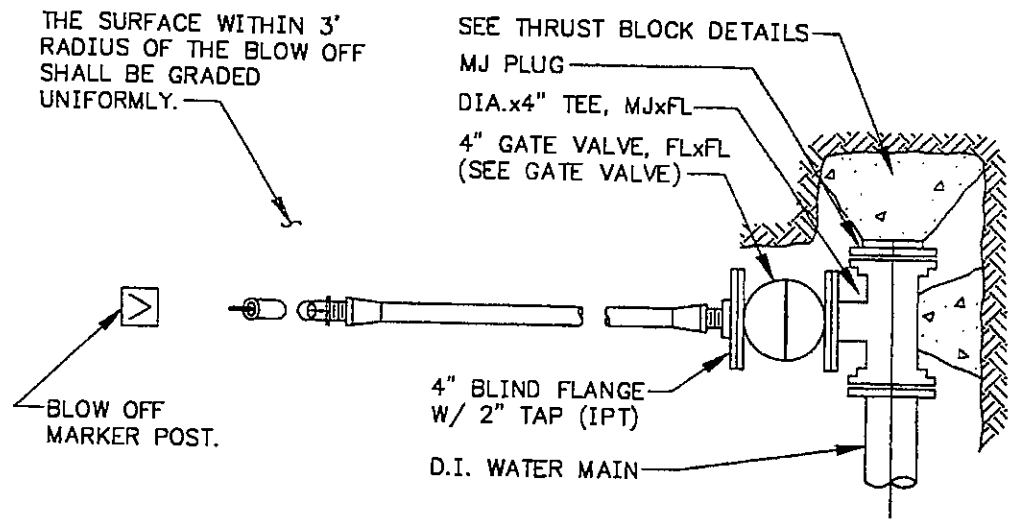
NEW CONSTRUCTION
INSTALL–
1–MAIN SIZE x 2" TAPPED TEE
1–6"x2" BRASS NIPPLE
1–2" GATE VALVE, THREADED
1–2" FORD PACKJOINT ADAPTER

2" OR SMALLER, OUTSIDE INSTALLED IRRIGATION SYSTEM COMBINED WITH THE DOMESTIC SYSTEM

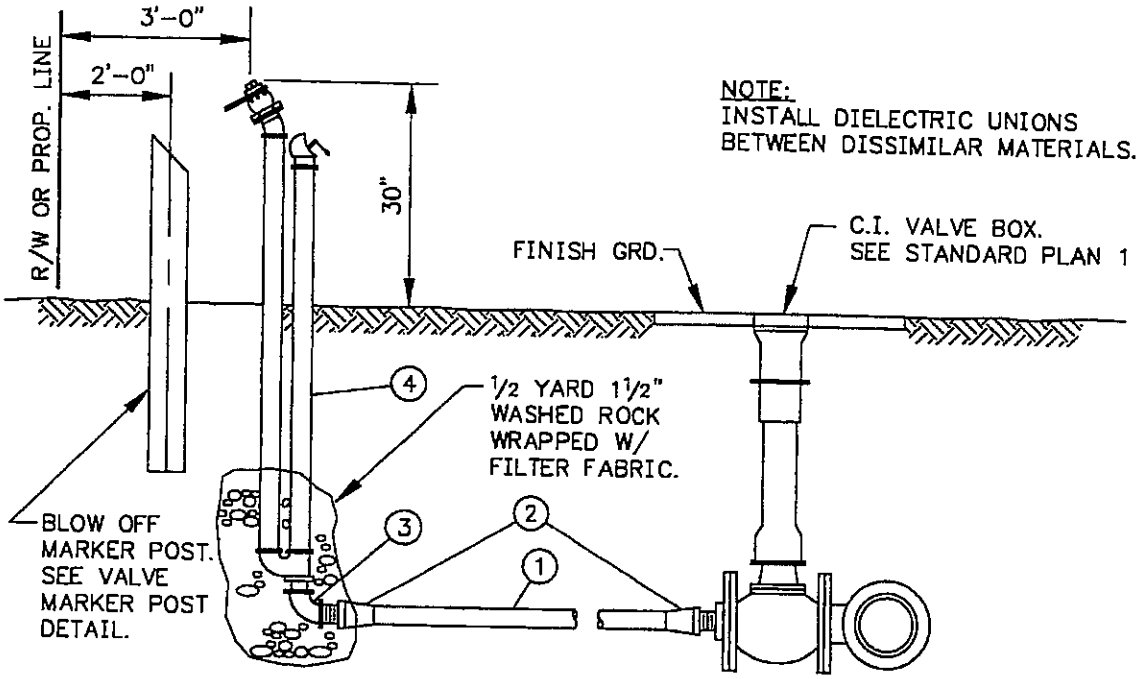
TCC-DET-07

TIMBERLAKES COMMUNITY CLUB, INC.
WATER SYSTEM

SHEET 7



PLAN

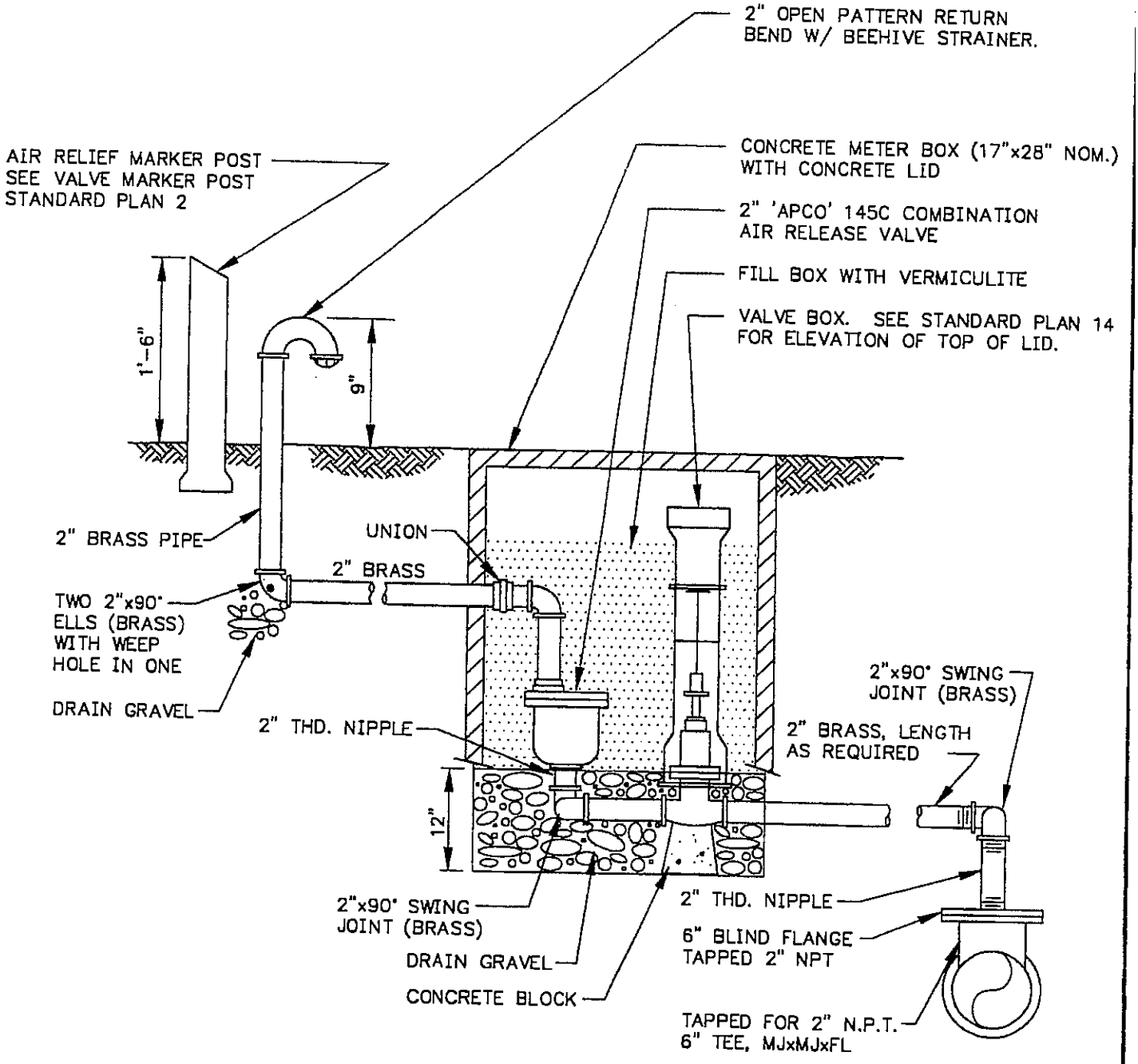


1. 2" SOFT COPPER LINE, AWWA TYPE K, SPEC. 7S-CR
2. 2" FLARED COPPER CONNECTION, FORD C28-77 OR MUELLER 110 COMPRESSION FITTING.
3. 2" 90° BRASS STREET ELL.
4. BLOWOFF HYDRANT, KUPFERLE FOUNDRY NO. 77 OR EQUAL,, BRONZE TO BRONZE DESIGN, SERVICEABLE FROM ABOVE WITH OUTLET EXPOSED, 2½" NST OUTLET, LOCKING CAP ON OPERATOR NUT.
5. 4 MIL POLYETHYLENE BETWEEN FITTINGS AND CONCRETE BLOCK. MAINTAIN CLEARANCE FROM BOLTS AND FLANGES.

2" BLOW-OFF ASSEMBLY

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 8

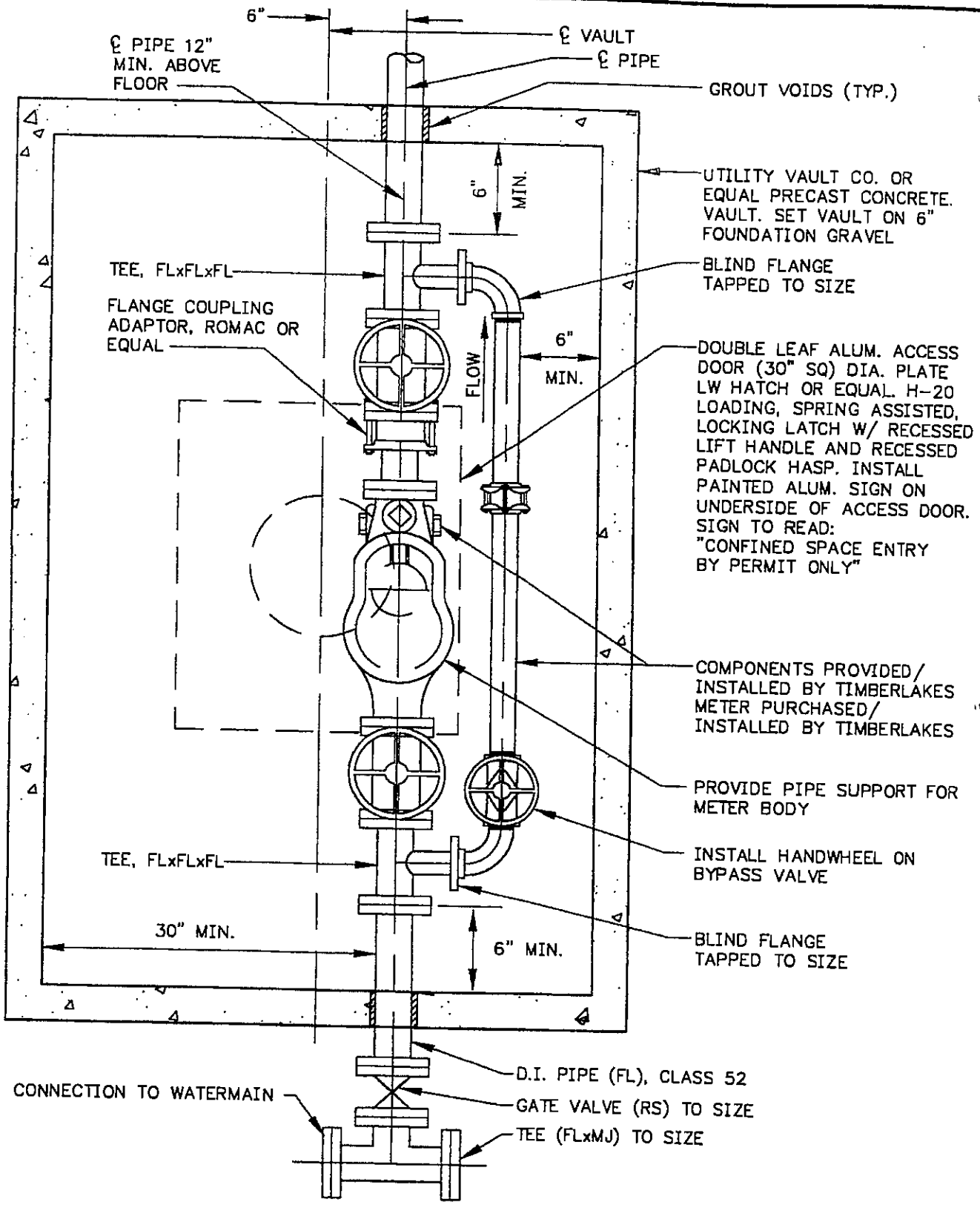
TCC-DET-08



1" AIR & VACUUM RELIEF VALVE

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 9

TCC-DET-09



NOTE:
GENERAL REQUIREMENTS FOR 3" AND LARGER METER INSTALLATIONS ARE SHOWN. EACH PROJECT INSTALLATION SHALL BE DESIGNED BY THE DISTRICT'S ENGINEER.

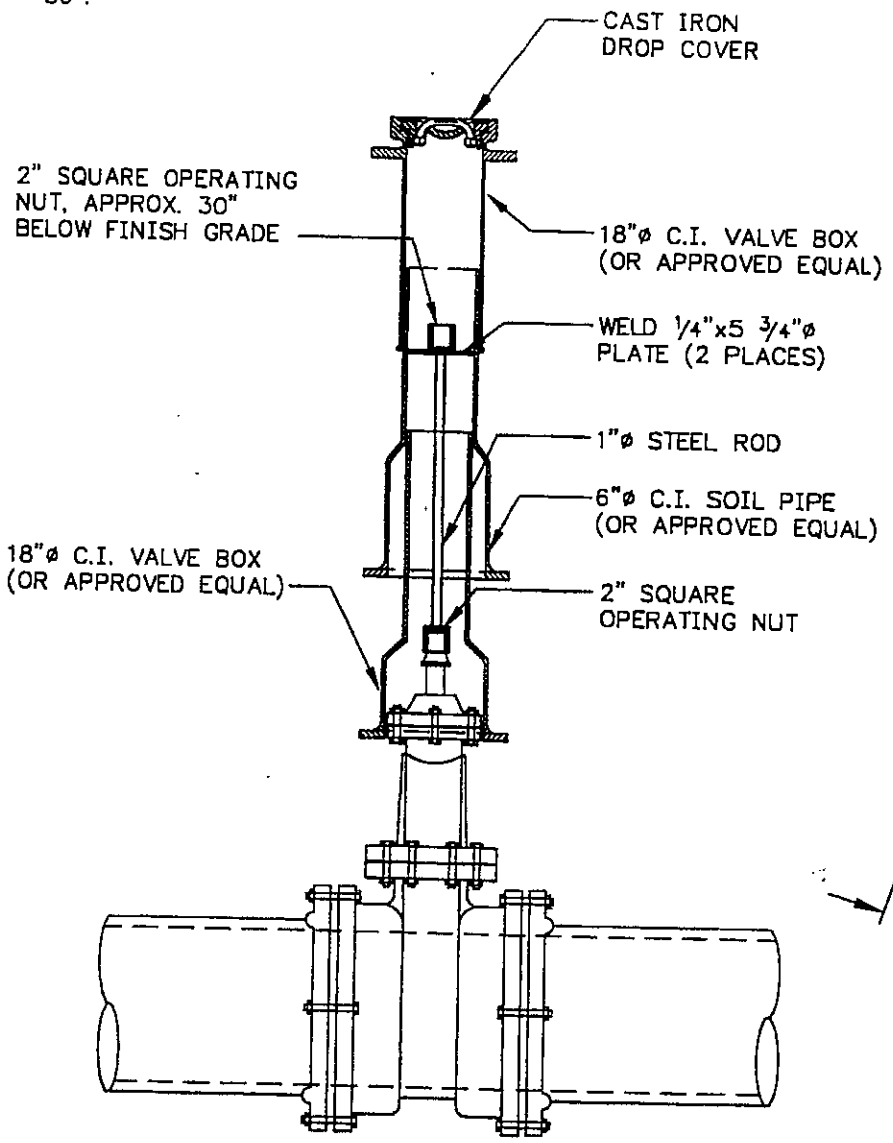
METER INSTALLATION 3" & LARGER

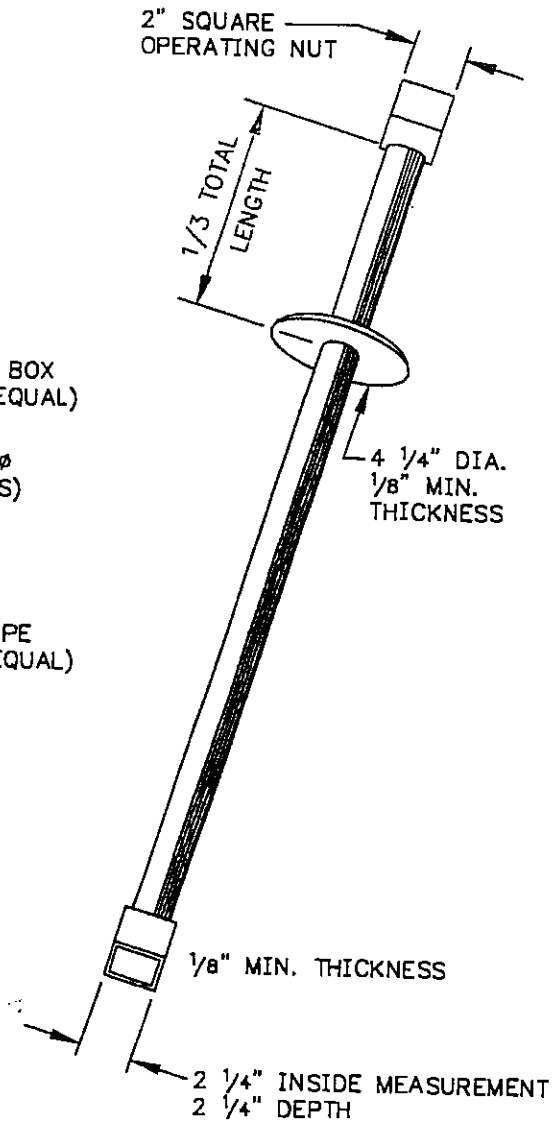
TCC-DET-10

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 10

NOTE:

VALVE EXTENSION SHALL BE INSTALLED WHEN DISTANCE BETWEEN FINISH GRADE AND TOP OF VALVE NUT EXCEEDS 30".





VALVE OPERATING NUT EXTENSION

LENGTH AS REQUIRED TO PUT OPERATING NUT, ONE (1) FOOT FROM SURFACE. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN THREE (3) FEET BELOW FINISHED GRADE. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION TO BE USED PER VALVE.

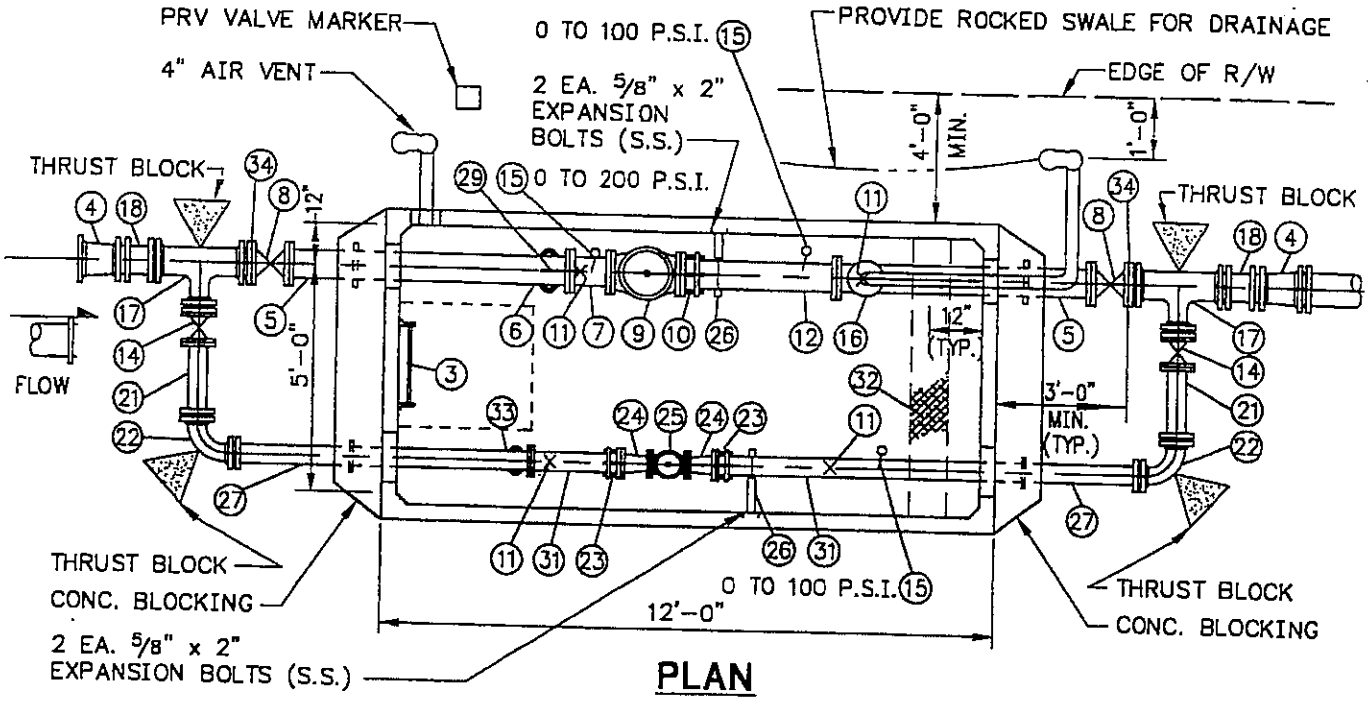
NOTE:

1. ALL EXTENSIONS ARE TO BE MADE OF STEEL, SIZED AS NOTED, AND PAINTED WITH TWO COATS OF METAL PAINT.

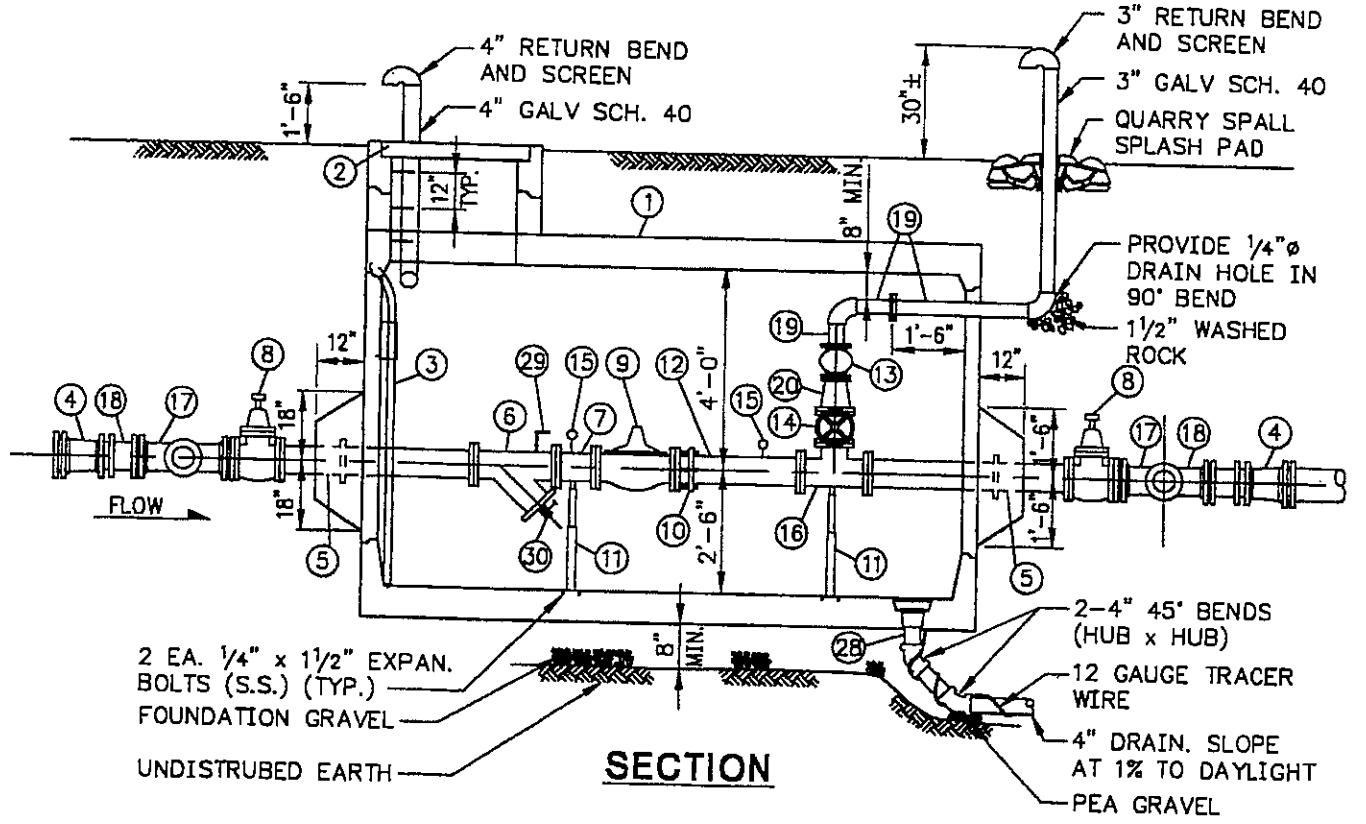
VALVE OPERATING EXTENSION

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 11

TCC-DET-11



PLAN

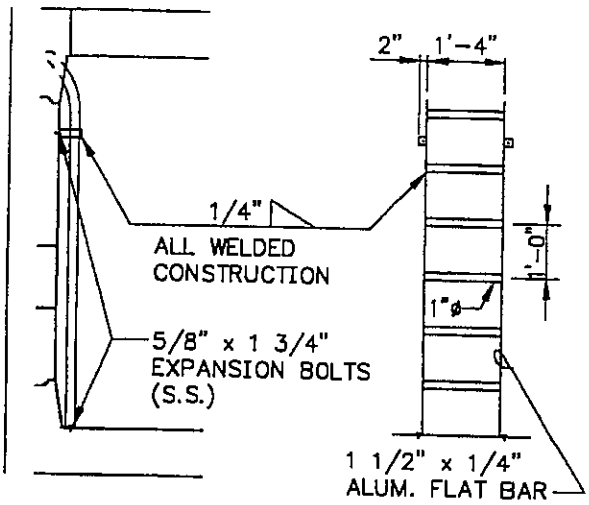


SECTION

PRESSURE REDUCING STATION

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 12

TCC-DET-12



LADDER DETAIL

MATERIAL LIST

1. UTILITY VAULT
2. BILCO COVER, 30" SQUARE MIN. OR AS SHOWN ON DWG. (DWG. GOVERNS)
3. ALUMINUM LADDER (SEE DETAIL)
4. 8" x 6" REDUCER (MJ x MJ)
5. 6" WALL FLANGE SPOOL (FL x PE)
6. 6" WYE STRAINER (FL x FL)
7. 6" SPOOL (FL x FL) LENGTH AS REQUIRED
8. 6" GATE VALVE (FL x FL)
9. 6" PRESSURE REDUCING VALVE (FL x FL) W/ INDICATOR
10. 6" FLANGE COUPLING ADAPTER
11. ADJUSTABLE PIPE SUPPORT AS REQUIRED
12. 6" SPOOL (PE x FL) LENGTH AS REQUIRED
13. 3" ROLL SEAL PRESSURE RELIEF VALVE
14. 4" GATE VALVE (FL x MJ)
15. PRESSURE GAUGE
16. 6" x 4" TEE (FL x FL)
17. 6" x 4" TEE (MJ x FL)
18. 6" x 18" D.I. NIPPLE
19. 3" SCH. 40 GALV. SPOOL W/ 3" COMPANION FLANGE X 3" I.P. THREAD
20. 4" x 3" REDUCER (FL x FL). INSTALL BASKET STRAINER FOR 3" ROLL SEAL VALVE ON 4" SIDE OF REDUCER.
21. 4" SPOOL (PE x PE) LENGTH AS REQUIRED
22. 4" 90° BEND (MJ x MJ)
23. 4" FLANGED COUPLING ADAPTER (FCA)
24. 4" x 3" REDUCER (FL x FL)
25. 3" PRESSURE REDUCING VALVE (FL x FL) W/ INDICATOR
26. PIPE HANGER AS REQUIRED
27. 4" WALL FLANGE SPOOL (FL x PE) LENGTH AS REQUIRED
28. REMOVABLE SUMP DRAIN (WITH 1" LIP)
29. 3/4" CORP STOP W/ HOSE BIB
30. 2" WHEEL VALVE
31. 4" SPOOL (FL x PE) LENGTH AS REQUIRED
32. GALVANIZED GRATING (2 PIECES)
33. 4" WYE STRAINER (FL X FL)
33. 6" ADAPTOR (FLxMJ)

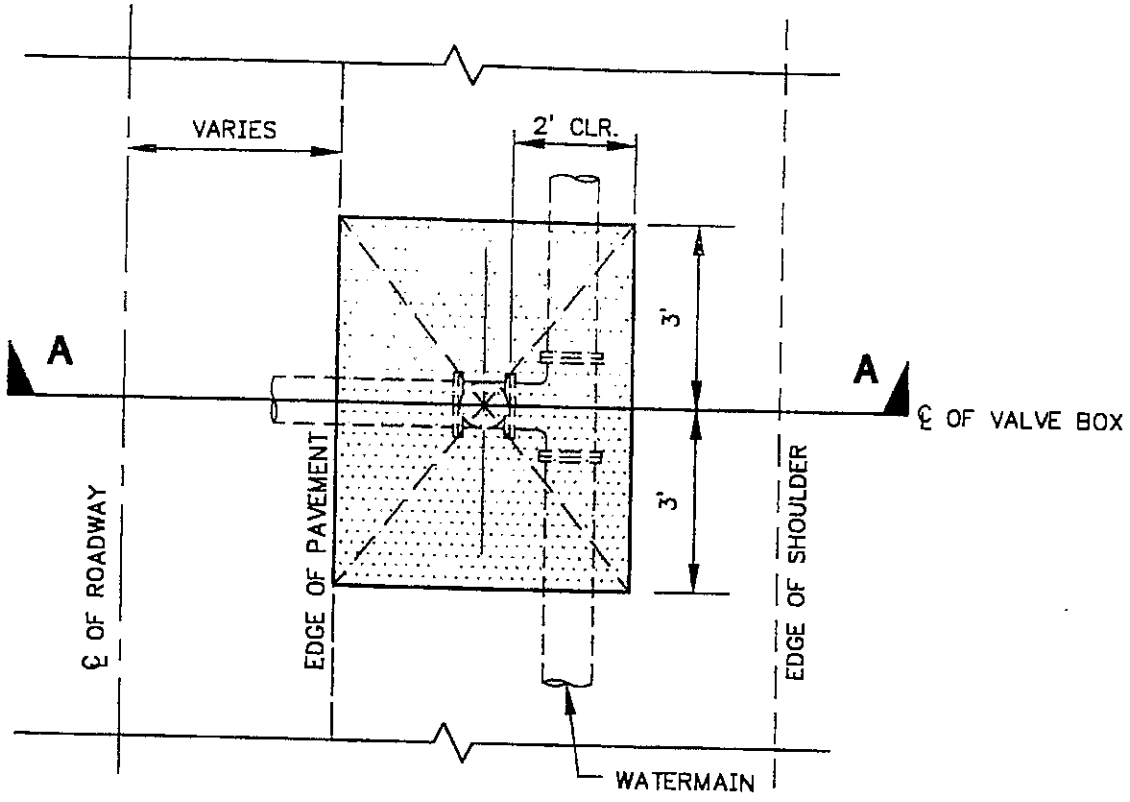
NOTE:

1. THIS IS A GENERIC MATERIAL LIST. FITTINGS AND VALVE SIZES MAY DIFFER, AND ARE SHOWN ON PROJECT DETAILS.

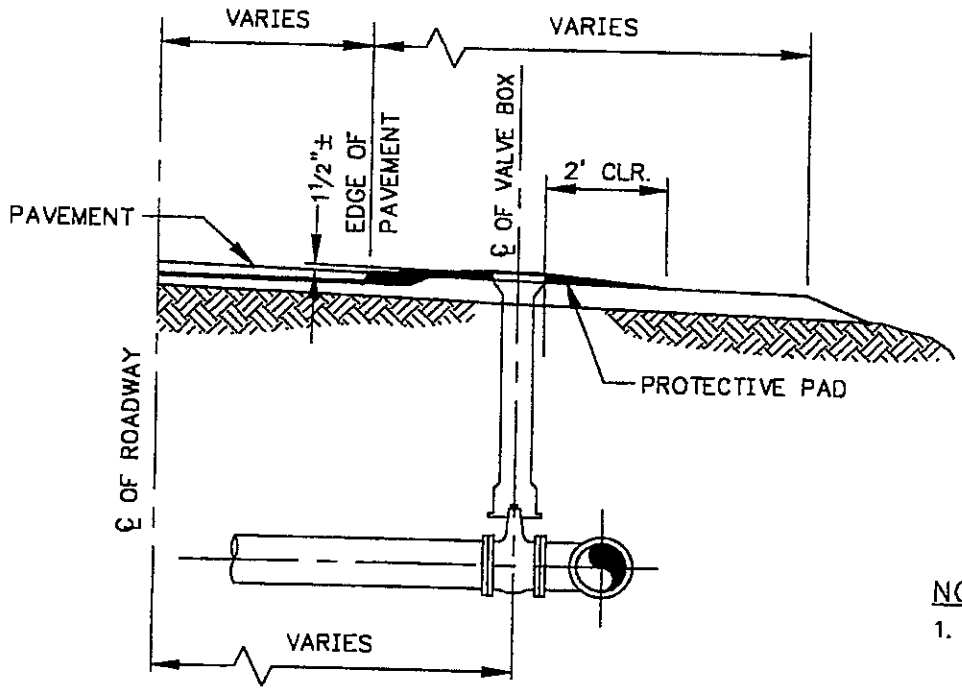
PRESSURE REDUCING STATION

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 12A

TCC-DET-12



PLAN



SECTION A-A

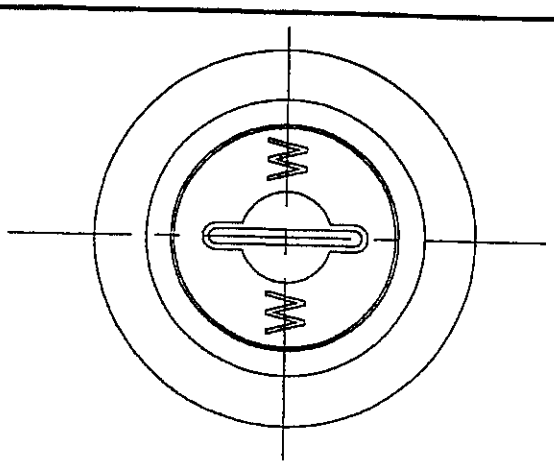
NOTES:

1. PROTECTIVE PAD SHALL BE 2" CLASS 'B' ASPHALTIC CONCRETE.
2. TOE OF PROTECTIVE PAD SHALL MATCH ADJACENT GRADE.

VALVE BOX PROTECTIVE PAD

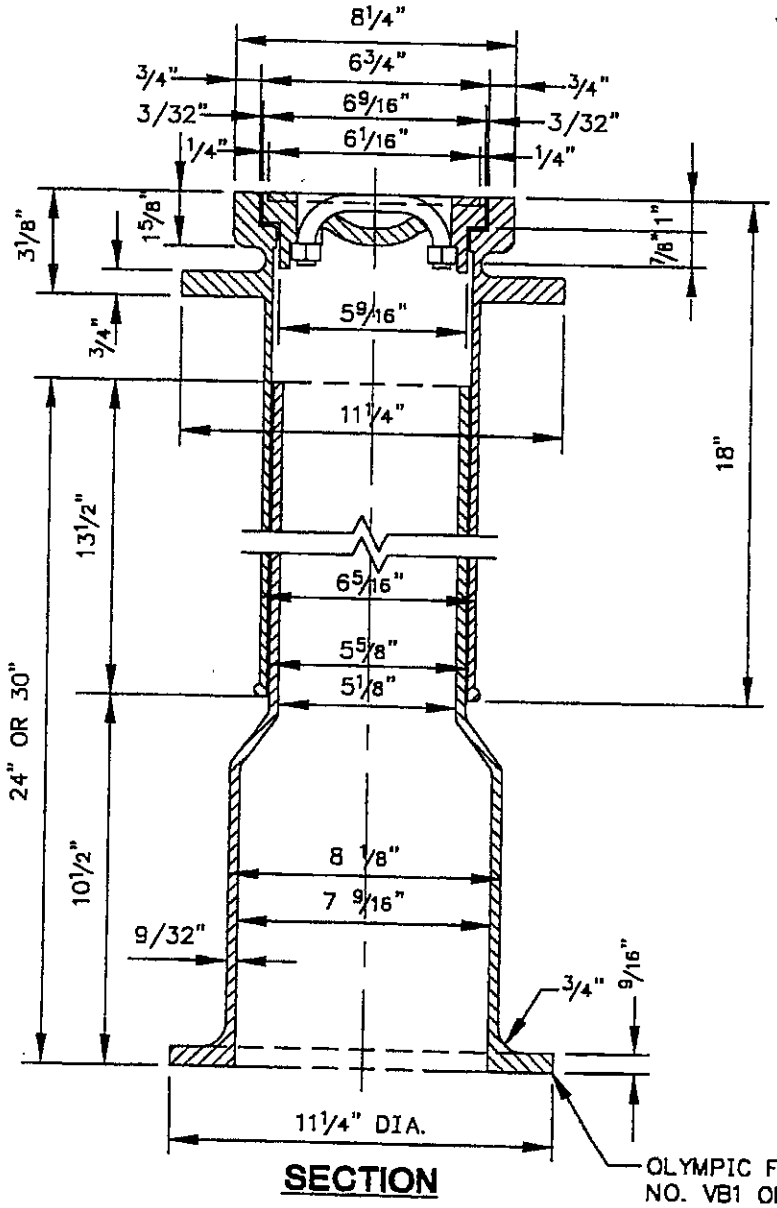
TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 13

TCC-DET-13



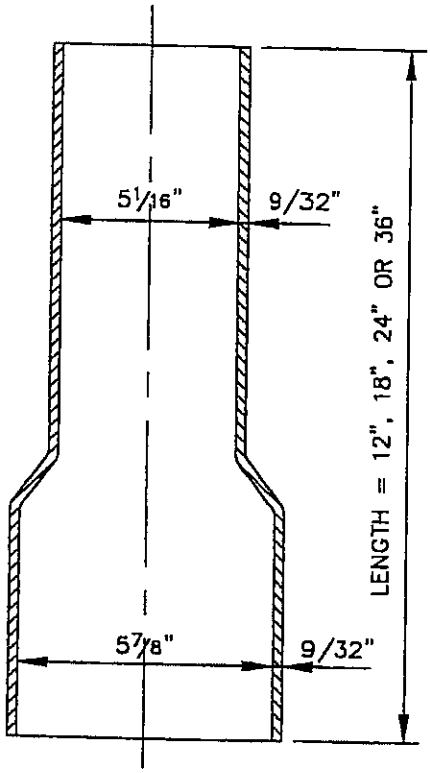
PLAN

NOTE:
HEAVY DUTY VALVE BOX
SEATTLE STANDARD OR
EQUAL APWA STD. #67



SECTION

OLYMPIC FOUNDARY PART
NO. VB1 OR EQUAL



EXTENSION

VALVE BOX

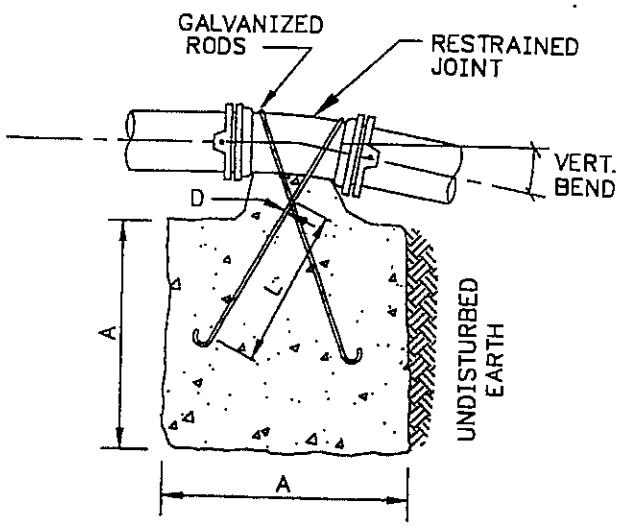
TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 14

TCC-DET-14

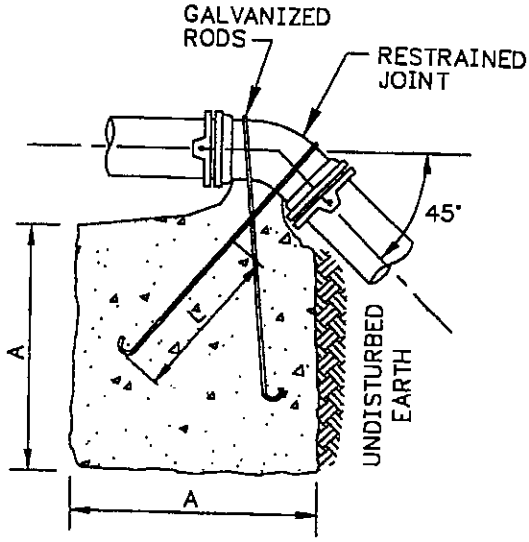
VERTICAL BLOCKING FOR 11 1/4°–22 1/2°–30° BENDS					
PIPE SIZE	V B	CU FT	A	D	L
4"	11 1/4°	8	2.0'	3/4"	1.5'
	22 1/2°	11	2.2'		2.0'
	30°	17	2.6'		
6"	11 1/4°	11	2.2'	3/4"	2.0'
	22 1/2°	25	2.9'		
	30°	41	3.5'		
8"	11 1/4°	16	2.5'	3/4"	2.0'
	22 1/2°	47	3.6'		
	30°	70	4.1'	3/4"	2.5'
12"	11 1/4°	32	3.2'	3/4"	2.0'
	22 1/2°	88	4.5'	7/8"	3.0'
	30°	132	5.1'		
16"	11 1/4°	70	4.1'	7/8"	3.0'
	22 1/2°	184	5.7'	1 1/8"	4.0'
	30°	275	6.5'	1 1/4"	
20"	11 1/4°	91	4.5'	7/8"	3.0'
	22 1/2°	225	6.1'	1 1/4"	4.0'
	30°	330	6.9'	1 3/8"	4.5'
24"	11 1/4°	128	5.0'	1"	3.5'
	22 1/2°	320	6.8'	1 3/8"	4.5'
	30°	480	7.9'	1 5/8"	5.5'
VERTICAL BLOCKING FOR 45° BENDS					
4"	45°	30	3.1'	3/4"	2.0'
6"		68	4.1'		
8"		123	5.0'		
12"		232	6.1'	3/4"	2.5'
16"		478	7.8'	1 1/8"	4.0'
20"		560	8.2'	1 1/4"	
24"		820	9.4'	1 3/8"	4.5'

NOTES:

1. CONCRETE BLOCKING BASED ON 200 PSI PRESSURE AND 2500 PSI CONCRETE.



VERTICAL BLOCKING
FOR 11 1/4°, 22 1/2°, & 30° BENDS



VERTICAL BLOCKING
FOR 45° BENDS

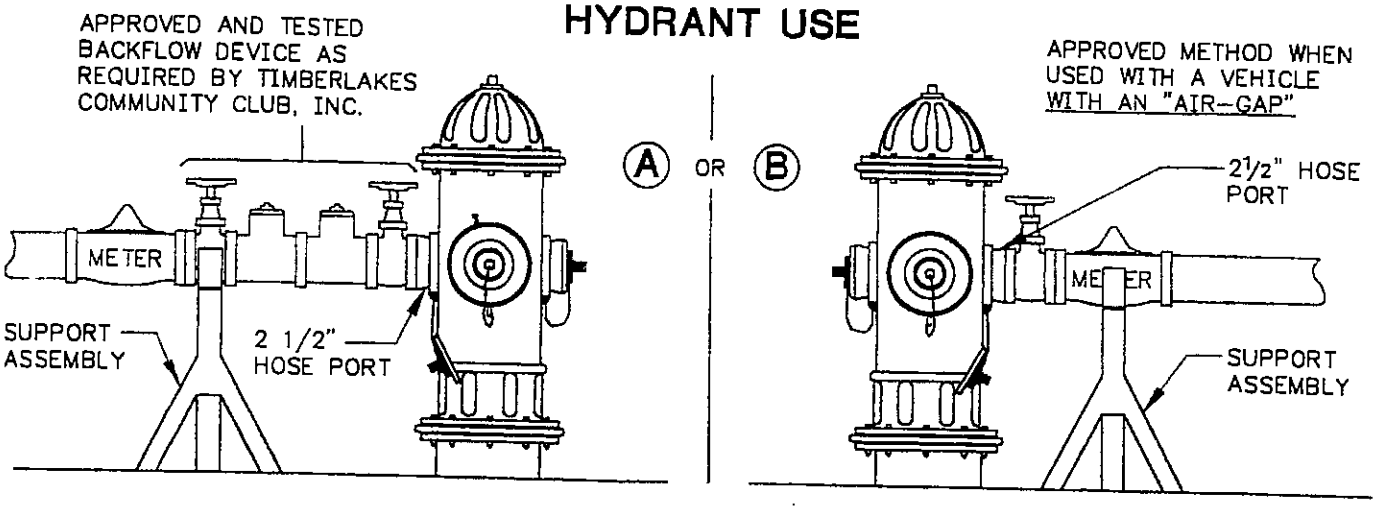
VERTICAL CONCRETE BLOCKING

TIMBERLAKES COMMUNITY CLUB, INC.
WATER SYSTEM

SHEET 15

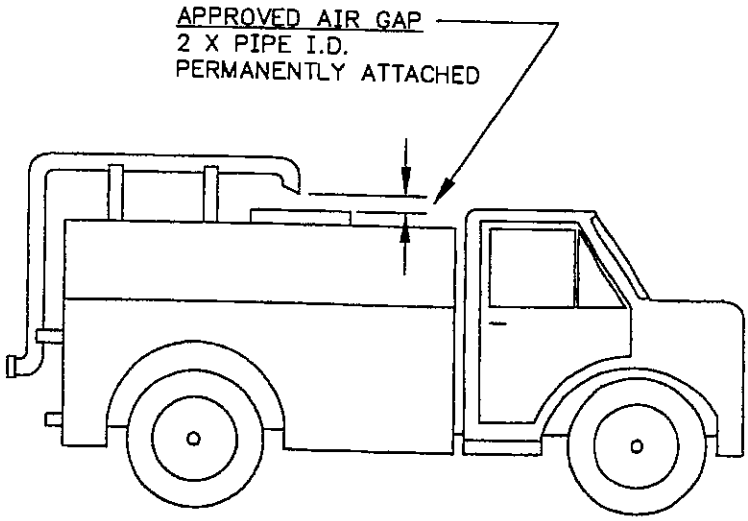
TWA-DET-15

HYDRANT USE



HYDRANT USE PROCEDURES:

1. NOTIFY THE CLUB SHOP, (360) 427-0109 BEFORE CONNECTING TO HYDRANT.
2. THERE SHALL BE AN ACCEPTABLE WASHINGTON STATE APPROVED " BACKFLOW DEVICE" WHEN REQUIRED.
3. WITH AN APPROVED "AIR GAP", THERE SHALL BE AN AUXILIARY VALVE ATTACHED TO THE 2 1/2" HOSE PORT OF THE HYDRANT PROVIDED BY THE PERMIT HOLDER.
4. OPENING AND CLOSING OF HYDRANT VALVE SHALL BE WITH AN ACCEPTABLE WRENCH TO RECEIVE THE 5-SIDED NUT.
5. THE HYDRANT VALVE SHALL BE FULLY OPENED AND THE WATER USE CONTROLLED EXCLUSIVELY BY THE AUXILIARY VALVE.
6. THE AUXILIARY VALVE SHALL BE OPERATED IN SLOW MANNER TO PREVENT UNDUE EXCESSIVE PRESSURE ON THE WATER SYSTEM.
7. BACKFLOW DEVICE AND/OR METER ASSEMBLY SHALL BE PROPERLY SUPPORTED WITH SUPPORTS PROVIDED BY AGREEMENT HOLDER.
8. ANY VIOLATION OF ANY OF THE ABOVE SHALL CONSTITUTE TERMINATION OF WATER USE AGREEMENT AND USER TO BE SUBJECT TO A FINE.
9. IF UNABLE TO OPERATE OR CLOSE THE HYDRANT PROPERLY, CALL THE CLUB SHOP IMMEDIATELY FOR ASSISTANCE AT (360) 427-0109.
10. WATER FROM HYDRANTS WITHIN THE WATER SYSTEM CANNOT BE USED OUTSIDE THE WATER SYSTEM BOUNDARIES. VIOLATIONS ARE SUBJECT TO LOSS OF WATER USE PERMITS AND MONETARY FINES.



FIRE HYDRANT USE REQUIREMENTS

TIMBERLAKES COMMUNITY CLUB, INC. WATER SYSTEM	SHEET 16

TWA-DET-16

Washington Office
505 South 336th St., Ste 620
Federal Way, WA 98003

TEL 253/661-5437
FAX 253/661-5430
arwa@reservestudy.com
www.reservestudy.com

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Update "With Site-Visit" Reserve Study

Timberlake Water System

Shelton, WA

Report #: **23247-1**
For Period Beginning: **July 1, 2015**
Expires: **June 30, 2016**

Date Prepared: **February 28, 2015**

MIKE FLEMING
CAI-RS
00153
DESIGNATION
RESERVE SPECIALIST

Hello, and welcome to your Reserve Study!

We don't want you to be surprised. This Report is designed to help you anticipate, and prepare for, the major common area expenses your association will face. Inside you will find:

1) **<u>The Reserve Component List</u> (the "Scope and Schedule" of your Reserve projects) – telling you what your association is Reserving for, what condition they are in now, and what they'll cost to replace.**

2) **<u>An Evaluation of your current Reserve Fund Size and Strength</u> (Percent Funded). This tells you your financial starting point, revealing your risk of deferred maintenance and special assessments.**

3) **<u>A Recommended Multi-Year Reserve Funding Plan</u>, answering the question… "What do we do now?"**

More Questions?

Visit our website at www.ReserveStudy.com or call us at:

253/661-5437

<u>Relax</u>, it's from

ASSOCIATION RESERVES
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Table of Contents

3- Minute Executive Summary

Association:	**Timberlake Water System**	**#: 23247-1**
Location:	**Shelton, WA**	**# of Units: 1350**
Report Period:	**July 1, 2015 through June 30, 2016**	

Findings/Recommendations as-of 7/1/2015:

Projected Starting Reserve Balance:	**$644,423**
Current Fully Funded Reserve Balance:	**$6,925,958**
Average Reserve Deficit (Surplus) Per Unit:	**$4,653**
100% 2015/2016 Annual "Full Funding" Contributions:	**$607,500**
70% 2015/2016 Monthly "Threshold Funding" Contributions	**$560,300**
Baseline contributions (minimum to keep Reserves above $0):	**$560,300**
Recommended 2015/2016 Special Assessment for Reserves:	**$0**

Most Recent Budgeted Reserve Contribution Rate: $158,460

Economic Assumptions:

Net Annual "After Tax" Interest Earnings Accruing to Reserves..... 1.00%

Annual Inflation Rate 3.00%

- **This is an "Update With-Site-Visit" Reserve Study, based on our on-site inspection on February 5, 2015 and meets or exceeds all requirements of the RCW. This study was prepared by, or under the supervision of a credentialed Reserve Specialist (RS 153).**
- **Your Reserve Fund is 9% Funded. This means the association's risk of special assessment and/or deferred maintenance is currently high. The objective of your multi-year Funding Plan is to fund your Reserves to a level where you will enjoy a low risk of such Reserve cash flow problems.**
- **Based on this starting point and your anticipated future expenses, is to significantly increase your Annual Reserve Contributions to within the 70% to 100% level as noted above. 100% "Full" and 70% contribution rates are designed to achieve these funding objectives *by the end* of our 30-year report scope.**
- **No assets appropriate for Reserve designation were knowingly excluded. The reader is directed to the attached and detailed Photographic Inventory Appendix (Photo Pages) to gain a comprehensive understanding of the basis of our recommendations for this year's report.**

Table 1: Executive Summary				23247-1
#	Component	Useful Life (yrs)	Rem. Useful Life (yrs)	Current Cost Estimate
	Capacity/Filter			
106	Water System Plan - Update	6	6	$45,000
901	Well Pump/Motor #1 - Replace	20	9	$20,000
901	Well Pump/Motor #2 - Replace	10	1	$20,000
901	Well Pump/Motor #3 - Replace	10	3	$22,000
904	Well #1 Control - Replace	30	9	$12,500
904	Well #2 Control - Replace	30	19	$12,500
904	Well #3 Control - Replace	30	23	$12,500
907	Filter System - Maintain/Replace	35	25	$105,000
	Store/Monitor			
910	Storage Tank, Steel - Replace	50	29	$450,000
911	Storage Tank, Concrete - Replace	60	17	$120,000
914	Storage Tank, Exterior - Recoat	10	1	$38,000
915	Storage Tank, Exterior-Blast/Recoat	10	11	$71,000
916	Storage Tank, Interior-Blast/Recoat	20	17	$119,500
918	Reservoir Control System - Replace	30	20	$30,000
919	Telemetry System - Replace	15	5	$3,500
	Treatment/Boost			
920	Hypochlorite Generator - Replace	30	17	$35,000
922	Hypochlorite Cells - Replace	10	7	$12,000
926	Treatment/Monitoring - Replace	20	10	$18,000
930	Booster System, Primary - Replace	20	9	$105,000
932	Booster System, Primary - Maintain	4	3	$7,500
934	Booster System, Back Up - Maintain	4	1	$5,000
	Distribution			
940	Water Main Line Project, B-Replace	60	1	$325,000
940	Water Main Line Project, C-Replace	60	2	$250,000
940	Water Main Line Project, D-Replace	20	5	$300,000
940	Water Main Line Project, E-Replace	60	8	$350,000
941	Water Main Line Project, A-Replace	60	54	$325,000
945	Remaining Main Lines, F- Replace	60	11	$1,528,750
945	Remaining Main Lines, G - Replace	60	12	$1,528,750
945	Remaining Main Lines, H - Replace	60	13	$1,528,750
945	Remaining Main Lines, I - Replace	60	14	$1,528,750
950	Hydrants - Add/Replace	N/A	5	$135,000
955	Pressure Reducing Valves - Replace	25	17	$37,050
956	Water Meters, A - Replace	15	1	$41,700
956	Water Meters, B - Replace	15	2	$37,300

Table 1: Executive Summary				23247-1
#	Component	Useful Life (yrs)	Rem. Useful Life (yrs)	Current Cost Estimate
956	Water Meters, C - Replace	15	3	$23,000
957	Water Meter Setters, A - Replace	30	16	$75,060
957	Water Meter Setters, B - Replace	30	17	$67,140
957	Water Meter Setters, C - Replace	30	18	$41,400
	Buildings/Site			
964	Building Roof - Replace	40	32	$30,400
970	Chain Link Fence - Replace	30	14	$10,300
	Systems/Equipment			
980	Generator, 200 KW - Upgrade	40	0	$175,000
994	Compact Tractor/Loader - Replace	25	6	$32,500
996	Truck - Replace	12	9	$6,000
996	Truck - Replace	12	0	$17,500
998	Leak Detector - Replace	12	2	$3,750
999	Meter Reader System - Replace	5	0	$3,500
46	Total Funded Components			

Note;

Yellow highlighted line items are expected to require attention in the initial year

Green highlighted items are expected to occur within the first five years.

Cross reference component numbers with photographic inventory appendix.

A reserve-funding threshold of $3,000 is established for your association (expenses below this level expected to be factored within operating budget)

Introduction

A Reserve Study is the art and science of anticipating, and preparing for, an association's major common area repair and replacement expenses. Partially art, because in this field we are making projections about the future. Partially science, because our work is a combination of research and well-defined computations, following consistent National Reserve Study Standard principles.

The foundation of this and every Reserve Study is your Reserve Component List (what you are reserving for). This is because the Reserve Component List defines the *scope and schedule* of all your anticipated upcoming Reserve projects. Based on that List and your starting balance, we calculate the association's Reserve Fund Strength (reported in terms of "Percent Funded"). Then we compute a Reserve Funding Plan to provide for the Reserve needs of the association. These form the three results of your Reserve Study.

Reserve contributions are not "for the future". Reserve contributions are designed to offset the ongoing, daily deterioration of your Reserve assets. Done well, a stable, budgeted Reserve Funding Plan will collect sufficient funds from the owners who enjoyed the use of those assets, so the association is financially prepared for the irregular expenditures scattered through future years when those projects eventually require replacement.

Methodology

For this Update With-Site-Visit Reserve Study, we started with a review of your prior Reserve Study, then looked into recent Reserve expenditures, evaluated how expenditures are handled (ongoing maintenance vs Reserves), and researched any well-established association precedents. We performed an on-site inspection to evaluate your common areas, *updating and adjusting* your Reserve Component List as appropriate.

Which Physical Assets are Funded by Reserves?

RESERVE COMPONENT "FOUR-PART TEST"

There is a national-standard four-part test to determine which expenses should appear in your Reserve Component List. First, it must be a common area maintenance responsibility. Second, the component must have a limited life. Third, the remaining life must be predictable (or it by definition is a *surprise* which cannot be accurately anticipated). Fourth, the component must be above a minimum threshold cost (often between .5% and 1% of an association's total budget). This limits Reserve Components to major, predictable expenses. Within this framework, it is inappropriate to include *lifetime* components, unpredictable expenses (such as damage due to fire, flood, or earthquake), and expenses more appropriately handled from the Operational Budget or as an insured loss.

How do we establish Useful Life and Remaining Useful Life estimates?

1) Visual Inspection (observed wear and age)
2) Association Reserves database of experience
3) Client History (install dates & previous life cycle information)
4) Vendor Evaluation and Recommendation

How do we establish Current Repair/Replacement Cost Estimates?

In this order…

1) Actual client cost history, or current proposals
2) Comparison to Association Reserves database of work done at similar associations
3) Vendor Recommendations
4) Reliable National Industry cost estimating guidebooks

How much Reserves are enough?

Reserve adequacy is not measured in cash terms. Reserve adequacy is found when the *amount* of current Reserve cash is compared to Reserve component deterioration (the *needs of the association*). Having *enough* means the association can execute its projects in a timely manner with existing Reserve funds. Not having *enough* typically creates deferred maintenance or special assessments.

Adequacy is measured in a two-step process:

1) Calculate the *value of deterioration* at the association (called Fully Funded Balance, or FFB).
2) Compare that to the Reserve Fund Balance, and express as a percentage.

Each year, the *value of deterioration* at the association changes. When there is more deterioration (as components approach the time they need to be replaced), there should be more cash to offset that deterioration and prepare for the expenditure. Conversely, the *value of deterioration* shrinks after projects are accomplished. The *value of deterioration* (the FFB) changes each year, and is a moving but predictable target.

There is high risk of special assessments and deferred maintenance when the Percent Funded is *weak*, below 30%. Approximately 30% of all associations are in this high risk range. While the 100% point is Ideal (indicating Reserve cash is equal to the *value of deterioration*), a Reserve Fund in the 70% -130% range is considered strong (low risk of special assessment).

Measuring your Reserves by Percent Funded tells how well prepared your association is for upcoming Reserve expenses. New buyers should be very aware of this important disclosure!

How much should we contribute?

According to National Reserve Study Standards, there are four Funding Principles to balance in developing your Reserve Funding Plan. Our first objective is to design a plan that provides you with sufficient cash to perform your Reserve projects on time. Second, a stable contribution is desirable because it keeps these naturally irregular expenses from unsettling the budget.

Reserve contributions that are evenly distributed over current and future owners enable each owner to pay their fair share of the association's Reserve expenses over the years. And finally, we develop a plan that is fiscally responsible and safe for Board members to recommend to their association. Remember, it is the Board's job to provide for the ongoing care of the common areas. Board members invite liability exposure when Reserve contributions are inadequate to offset ongoing common area deterioration.

What is our Recommended Funding Goal?

Maintaining the Reserve Fund at a level equal to the *value* of deterioration is called "Full Funding" (100% Funded). As each asset ages and becomes "used up", the Reserve Fund grows proportionally. **This is simple, responsible, and our recommendation.** Evidence shows that associations in the 70-130% range *enjoy a low risk of special assessments or deferred maintenance*.

Allowing the Reserves to fall close to zero, but not below zero, is called Baseline Funding. Doing so allows the Reserve Fund to drop into the 0-30% range, where there is a high risk of special assessments & deferred maintenance. Since Baseline Funding still provides for the timely execution of all Reserve projects, and only the "margin of safety" is different, Baseline Funding contributions average only 10% - 15% less than Full Funding contributions. Threshold Funding is the title of all other Cash or Percent Funded objectives *between* Baseline Funding and Full Funding.

Site Inspection Notes

Our site inspection was conducted to update information that appeared in our prior 2012/2013 reserve study. The component inventory was analyzed for completeness and accuracy. All components were re-inspected and checked for appropriateness for reserve funding using the standard four-part test.

During our site visit on February 5, 2015, we noted current condition, materials, apparent levels of care and maintenance as well as exposure to weather elements.

Timberlake Water System serves a community with 1,350 Lots and some assets are now approaching 47 years old. Members enjoy improvements to system infrastructure and water conservation in recent years.

The state of Washington requires Group A water systems to cause the preparation of a comprehensive Water System Plan to be prepared every six years. Updating of plan was ongoing as our report was written in early 2015 but WSP will not be complete for months into the future. Adjust component assumptions for future reserve study updates once expert analysis is complete and as conditions merit.

Also noted was the full time maintenance staff appears to provide significant benefit for ongoing maintenance, repairs and replacements for many of the common area responsibilities (including large scale improvement projects).

The reader is directed to the attached and detailed Photographic Inventory Appendix (Photo Pages) to gain a comprehensive understanding of the basis of our recommendations for this year's report.

Projected Expenses

While this Reserve Study looks forward 30 years, we have no expectation that all these expenses will all take place as anticipated. This Reserve Study needs to be updated annually because we expect the timing of these expenses to shift and the size of these expenses to change. We do feel more certain of the timing and cost of near-term expenses than expenses many years away. Your *first five years* of projected Reserve expenses total $1,004,734. Adding the next five years, your *first ten years* of projected Reserve expenses are $2,276,580. Please be aware of your near-term expenses, which we are able to project more accurately than the more distant projections.

The figure below summarizes the projected future expenses at your association as defined by your Reserve Component List. A summary of these expenses are shown in Table 5, while details of the projects that make up these expenses are shown in Table 6.

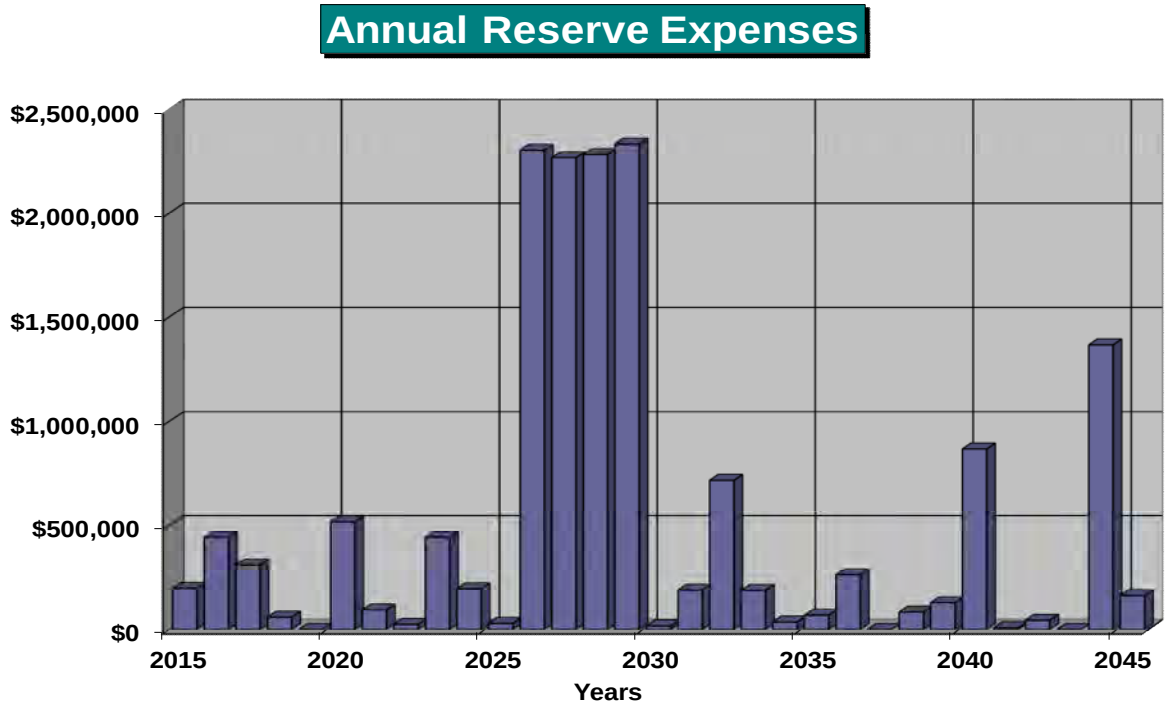


Figure 1

Reserve Fund Status

The starting point for our financial analysis is your Reserve Fund balance, projected to be $644,423 as-of the start of your Fiscal Year on July 1, 2015. As of July 1, 2015, your Fully Funded Balance is computed to be $6,925,958 (see Table 3). This figure represents the deteriorated value of your common area components. Comparing your Reserve Balance to your Fully Funded Balance indicates your Reserves are 9% Funded. Across the country approx 58% of associations in this range experience special assessments or deferred maintenance.

Recommended Funding Plan

Based on your current Percent Funded and your near-term and long-term Reserve needs, we are recommending budgeted contributions of $607,500 this Fiscal Year. The overall 30-yr plan, in perspective, is shown below. This same information is shown numerically in both Table 5 and Table 6.

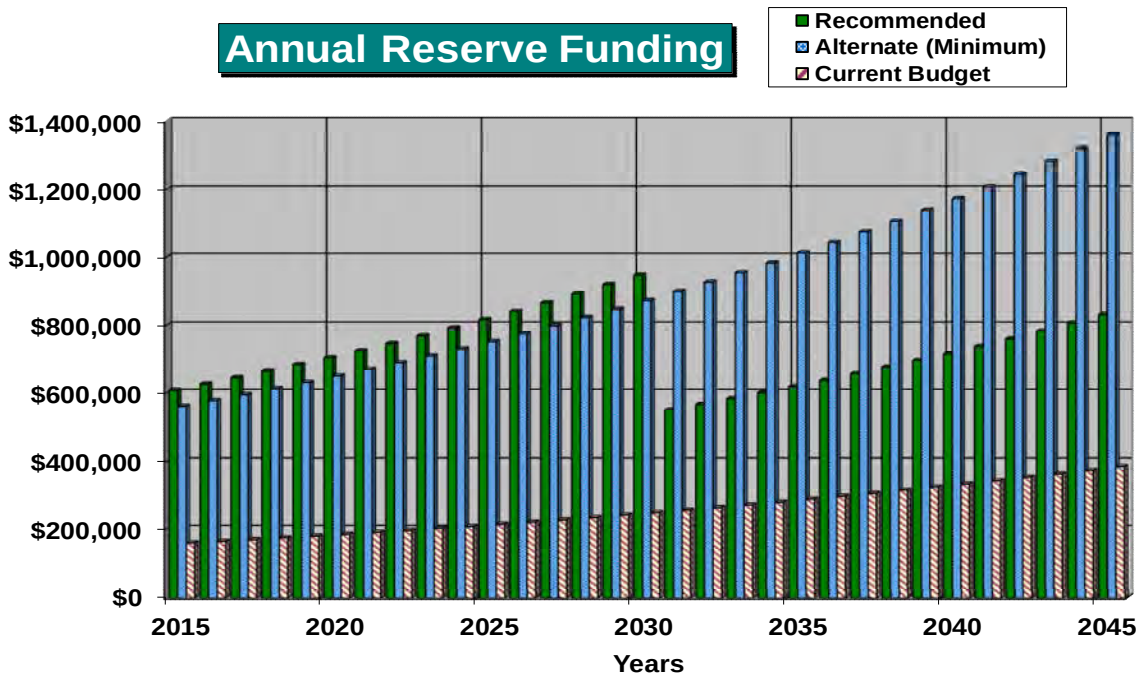


Figure 2

The following chart shows your Reserve balance under our recommended Full Funding Plan, an alternate Baseline Funding Plan, and at your current budgeted contribution rate, compared to your always-changing Fully Funded Balance target.

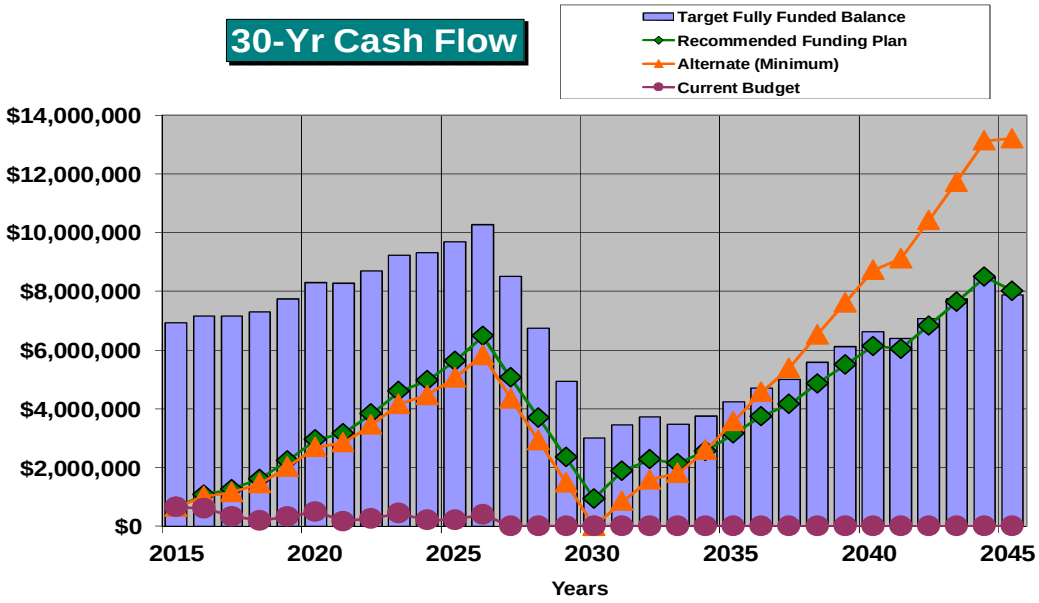


Figure 3

This figure shows this same information, plotted on a Percent Funded scale.

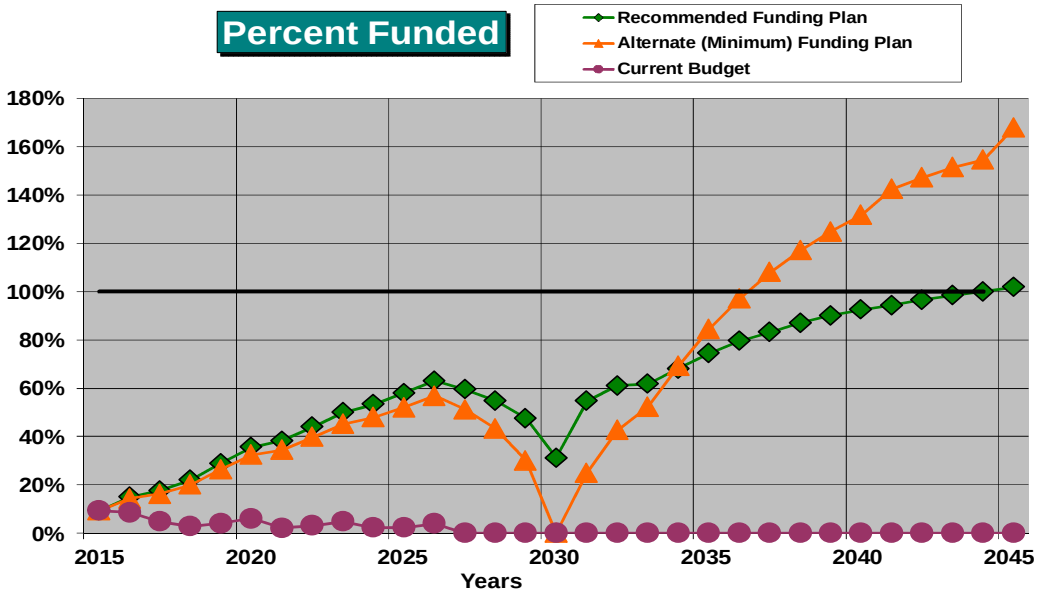


Figure 4

Table Descriptions

The tabular information in this Report is broken down into six tables.

Table 1 is a summary of your Reserve Components (your Reserve Component List), the information found in Table 2.

Table 2 is your Reserve Component List, which forms the foundation of this Reserve Study. This table represents the information from which all other tables are derived.

Table 3 shows the calculation of your Fully Funded Balance, the measure of your current Reserve component deterioration. For each component, the Fully Funded Balance is the fraction of life used up multiplied by its estimated Current Replacement Cost.

Table 4 shows the significance of each component to Reserve needs of the association, helping you see which components have more (or less) influence than others on your total Reserve contribution rate. The deterioration cost/yr of each component is calculated by dividing the estimated Current Replacement Cost by Useful Life, then that component's percentage of the total is displayed.

Table 5: This table provides a one-page 30-year summary of the cash flowing into and out of the Reserve Fund, with a display of the Fully Funded Balance, Percent Funded, and special assessment risk for each year.

Table 6: This table shows the cash flow detail for the next 30 years. This table makes it possible to see which components are projected to require repair or replacement each year, and the size of those individual expenses.

Table 2: Reserve Component List Detail 23247-1

#	Component	Quantity	Useful Life	Rem. Useful Life	[--- Current Cost Estimate ---] Best Case	Worst Case
	Capacity/Filter					
106	Water System Plan - Update	Every 6 years	6	6	$40,000	$50,000
901	Well Pump/Motor #1 - Replace	(1) 25 HP submersible 6"	20	9	$18,000	$22,000
901	Well Pump/Motor #2 - Replace	(1) 25 HP submersible 6"	10	1	$18,000	$22,000
901	Well Pump/Motor #3 - Replace	(1) 30 HP submersible 8"	10	3	$20,000	$24,000
904	Well #1 Control - Replace	(1) motor control	30	9	$10,000	$15,000
904	Well #2 Control - Replace	(1) motor control	30	19	$10,000	$15,000
904	Well #3 Control - Replace	(1) motor control	30	23	$10,000	$15,000
907	Filter System - Maintain/Replace	(6) tank system	35	25	$85,000	$125,000
	Store/Monitor					
910	Storage Tank, Steel - Replace	(1) 200,000 gallon	50	29	$400,000	$500,000
911	Storage Tank, Concrete - Replace	(1) 60,000 gallon	60	17	$100,000	$140,000
914	Storage Tank, Exterior - Recoat	(1) 200,000 gallon	10	1	$33,000	$43,000
915	Storage Tank, Exterior-Blast/Recoat	(1) 200,000 gallon	10	11	$66,000	$76,000
916	Storage Tank, Interior-Blast/Recoat	(1) 200,000 gallon	20	17	$112,000	$127,000
918	Reservoir Control System - Replace	(1) control panel	30	20	$25,000	$35,000
919	Telemetry System - Replace	(1) system	15	5	$3,000	$4,000
	Treatment/Boost					
920	Hypochlorite Generator - Replace	(1) US Filter	30	17	$30,000	$40,000
922	Hypochlorite Cells - Replace	(1) US Filter	10	7	$10,000	$14,000
926	Treatment/Monitoring - Replace	Pumps, sensors, monitors	20	10	$16,000	$20,000
930	Booster System, Primary - Replace	(1) Paco 9000	20	9	$95,000	$115,000
932	Booster System, Primary - Maintain	(1) Paco 9000	4	3	$5,000	$10,000
934	Booster System, Back Up - Maintain	(1) system, quad pump	4	1	$4,000	$6,000
	Distribution					
940	Water Main Line Project, B-Replace	Approx 2,600 LF	60	1	$312,000	$338,000
940	Water Main Line Project, C-Replace	Approx 2,000 LF	60	2	$240,000	$260,000
940	Water Main Line Project, D-Replace	Approx 2,400 LF	20	5	$288,000	$312,000
940	Water Main Line Project, E-Replace	Approx 2,800 LF	60	8	$336,000	$364,000
941	Water Main Line Project, A-Replace	Approx 2,600 LF	60	54	$312,000	$338,000
945	Remaining Main Lines, F- Replace	~(1/4) of 59,000 LF	60	11	$1,455,000	$1,602,500
945	Remaining Main Lines, G - Replace	~(1/4) of 59,000 LF	60	12	$1,455,000	$1,602,500
945	Remaining Main Lines, H - Replace	~(1/4) of 59,000 LF	60	13	$1,455,000	$1,602,500
945	Remaining Main Lines, I - Replace	~(1/4) of 59,000 LF	60	14	$1,455,000	$1,602,500
950	Hydrants - Add/Replace	(18) hydrants, existing	N/A	5	$126,000	$144,000
955	Pressure Reducing Valves - Replace	~(570) Cash Acme EB86U	25	17	$31,350	$42,750

Table 2: Reserve Component List Detail 23247-1

#	Component	Quantity	Useful Life	Rem. Useful Life	[--- Current Cost Estimate ---] Best Case	Worst Case
956	Water Meters, A - Replace	(417) meters	15	1	$37,530	$45,870
956	Water Meters, B - Replace	(373) meters	15	2	$33,570	$41,030
956	Water Meters, C - Replace	(230) meters	15	3	$20,700	$25,300
957	Water Meter Setters, A - Replace	(417) boxes/setters	30	16	$70,890	$79,230
957	Water Meter Setters, B - Replace	(373) boxes/setters	30	17	$63,410	$70,870
957	Water Meter Setters, C - Replace	(230) boxes/setters	30	18	$39,100	$43,700
	Buildings/Site					
964	Building Roof - Replace	Approx 3,800 GSF	40	32	$26,600	$34,200
970	Chain Link Fence - Replace	Approx 500 linear feet	30	14	$9,600	$11,000
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	(1) 200 KW, new	40	0	$150,000	$200,000
994	Compact Tractor/Loader - Replace	(1) Kubota B20	25	6	$30,000	$35,000
996	Truck - Replace	(1) 1992 GMC 3500HD	12	9	$5,000	$7,000
996	Truck - Replace	(1) 1992 GMC K2500	12	0	$15,000	$20,000
998	Leak Detector - Replace	(1) system	12	2	$3,500	$4,000
999	Meter Reader System - Replace	(2) meters, software	5	0	$3,000	$4,000
46	Total Funded Components					

Table 3: Fully Funded Balance 23247-1

#	Component	Current Cost Estimate		Effective Age		Useful Life		Fully Funded Balance
	Capacity/Filter							
106	Water System Plan - Update	$45,000	X	0	/	6	=	$0
901	Well Pump/Motor #1 - Replace	$20,000	X	11	/	20	=	$11,000
901	Well Pump/Motor #2 - Replace	$20,000	X	9	/	10	=	$18,000
901	Well Pump/Motor #3 - Replace	$22,000	X	7	/	10	=	$15,400
904	Well #1 Control - Replace	$12,500	X	21	/	30	=	$8,750
904	Well #2 Control - Replace	$12,500	X	11	/	30	=	$4,583
904	Well #3 Control - Replace	$12,500	X	7	/	30	=	$2,917
907	Filter System - Maintain/Replace	$105,000	X	10	/	35	=	$30,000
	Store/Monitor							
910	Storage Tank, Steel - Replace	$450,000	X	21	/	50	=	$189,000
911	Storage Tank, Concrete - Replace	$120,000	X	43	/	60	=	$86,000
914	Storage Tank, Exterior - Recoat	$38,000	X	9	/	10	=	$34,200
915	Storage Tank, Exterior-Blast/Recoat	$71,000	X	0	/	10	=	$0
916	Storage Tank, Interior-Blast/Recoat	$119,500	X	3	/	20	=	$17,925
918	Reservoir Control System - Replace	$30,000	X	10	/	30	=	$10,000
919	Telemetry System - Replace	$3,500	X	10	/	15	=	$2,333
	Treatment/Boost							
920	Hypochlorite Generator - Replace	$35,000	X	13	/	30	=	$15,167
922	Hypochlorite Cells - Replace	$12,000	X	3	/	10	=	$3,600
926	Treatment/Monitoring - Replace	$18,000	X	10	/	20	=	$9,000
930	Booster System, Primary - Replace	$105,000	X	11	/	20	=	$57,750
932	Booster System, Primary - Maintain	$7,500	X	1	/	4	=	$1,875
934	Booster System, Back Up - Maintain	$5,000	X	3	/	4	=	$3,750
	Distribution							
940	Water Main Line Project, B-Replace	$325,000	X	59	/	60	=	$319,583
940	Water Main Line Project, C-Replace	$250,000	X	58	/	60	=	$241,667
940	Water Main Line Project, D-Replace	$300,000	X	15	/	20	=	$225,000
940	Water Main Line Project, E-Replace	$350,000	X	52	/	60	=	$303,333
941	Water Main Line Project, A-Replace	$325,000	X	6	/	60	=	$32,500
945	Remaining Main Lines, F- Replace	$1,528,750	X	49	/	60	=	$1,248,479
945	Remaining Main Lines, G - Replace	$1,528,750	X	48	/	60	=	$1,223,000
945	Remaining Main Lines, H - Replace	$1,528,750	X	47	/	60	=	$1,197,521
945	Remaining Main Lines, I - Replace	$1,528,750	X	46	/	60	=	$1,172,042
950	Hydrants - Add/Replace	$135,000	X	0	/	0	=	$22,500
955	Pressure Reducing Valves - Replace	$37,050	X	8	/	25	=	$11,856

Table 3: Fully Funded Balance 23247-1

#	Component	Current Cost Estimate		Effective Age		Useful Life		Fully Funded Balance
956	Water Meters, A - Replace	$41,700	X	14	/	15	=	$38,920
956	Water Meters, B - Replace	$37,300	X	13	/	15	=	$32,327
956	Water Meters, C - Replace	$23,000	X	12	/	15	=	$18,400
957	Water Meter Setters, A - Replace	$75,060	X	14	/	30	=	$35,028
957	Water Meter Setters, B - Replace	$67,140	X	13	/	30	=	$29,094
957	Water Meter Setters, C - Replace	$41,400	X	12	/	30	=	$16,560
	Buildings/Site							
964	Building Roof - Replace	$30,400	X	8	/	40	=	$6,080
970	Chain Link Fence - Replace	$10,300	X	16	/	30	=	$5,493
	Systems/Equipment							
980	Generator, 200 KW - Upgrade	$175,000	X	40	/	40	=	$175,000
994	Compact Tractor/Loader - Replace	$32,500	X	19	/	25	=	$24,700
996	Truck - Replace	$6,000	X	3	/	12	=	$1,500
996	Truck - Replace	$17,500	X	12	/	12	=	$17,500
998	Leak Detector - Replace	$3,750	X	10	/	12	=	$3,125
999	Meter Reader System - Replace	$3,500	X	5	/	5	=	$3,500
								$6,925,958

Table 4: Component Significance 23247-1

#	Component	Useful Life	Current Cost Estimate	Deterioration Cost/yr	Deterioration Significance
	Capacity/Filter				
106	Water System Plan - Update	6	$45,000	$7,500	3.4%
901	Well Pump/Motor #1 - Replace	20	$20,000	$1,000	0.5%
901	Well Pump/Motor #2 - Replace	10	$20,000	$2,000	0.9%
901	Well Pump/Motor #3 - Replace	10	$22,000	$2,200	1.0%
904	Well #1 Control - Replace	30	$12,500	$417	0.2%
904	Well #2 Control - Replace	30	$12,500	$417	0.2%
904	Well #3 Control - Replace	30	$12,500	$417	0.2%
907	Filter System - Maintain/Replace	35	$105,000	$3,000	1.4%
	Store/Monitor				
910	Storage Tank, Steel - Replace	50	$450,000	$9,000	4.1%
911	Storage Tank, Concrete - Replace	60	$120,000	$2,000	0.9%
914	Storage Tank, Exterior - Recoat	10	$38,000	$3,800	1.7%
915	Storage Tank, Exterior-Blast/Recoat	10	$71,000	$7,100	3.2%
916	Storage Tank, Interior-Blast/Recoat	20	$119,500	$5,975	2.7%
918	Reservoir Control System - Replace	30	$30,000	$1,000	0.5%
919	Telemetry System - Replace	15	$3,500	$233	0.1%
	Treatment/Boost				
920	Hypochlorite Generator - Replace	30	$35,000	$1,167	0.5%
922	Hypochlorite Cells - Replace	10	$12,000	$1,200	0.5%
926	Treatment/Monitoring - Replace	20	$18,000	$900	0.4%
930	Booster System, Primary - Replace	20	$105,000	$5,250	2.4%
932	Booster System, Primary - Maintain	4	$7,500	$1,875	0.9%
934	Booster System, Back Up - Maintain	4	$5,000	$1,250	0.6%
	Distribution				
940	Water Main Line Project, B-Replace	60	$325,000	$5,417	2.5%
940	Water Main Line Project, C-Replace	60	$250,000	$4,167	1.9%
940	Water Main Line Project, D-Replace	20	$300,000	$15,000	6.8%
940	Water Main Line Project, E-Replace	60	$350,000	$5,833	2.7%
941	Water Main Line Project, A-Replace	60	$325,000	$5,417	2.5%
945	Remaining Main Lines, F- Replace	60	$1,528,750	$25,479	11.6%
945	Remaining Main Lines, G - Replace	60	$1,528,750	$25,479	11.6%
945	Remaining Main Lines, H - Replace	60	$1,528,750	$25,479	11.6%
945	Remaining Main Lines, I - Replace	60	$1,528,750	$25,479	11.6%
950	Hydrants - Add/Replace	N/A	$135,000	$0	0.0%
955	Pressure Reducing Valves - Replace	25	$37,050	$1,482	0.7%

Table 4: Component Significance 23247-1

#	Component	Useful Life	Current Cost Estimate	Deterioration Cost/yr	Deterioration Significance
956	Water Meters, A - Replace	15	$41,700	$2,780	1.3%
956	Water Meters, B - Replace	15	$37,300	$2,487	1.1%
956	Water Meters, C - Replace	15	$23,000	$1,533	0.7%
957	Water Meter Setters, A - Replace	30	$75,060	$2,502	1.1%
957	Water Meter Setters, B - Replace	30	$67,140	$2,238	1.0%
957	Water Meter Setters, C - Replace	30	$41,400	$1,380	0.6%
	Buildings/Site				
964	Building Roof - Replace	40	$30,400	$760	0.3%
970	Chain Link Fence - Replace	30	$10,300	$343	0.2%
	Systems/Equipment				
980	Generator, 200 KW - Upgrade	40	$175,000	$4,375	2.0%
994	Compact Tractor/Loader - Replace	25	$32,500	$1,300	0.6%
996	Truck - Replace	12	$6,000	$500	0.2%
996	Truck - Replace	12	$17,500	$1,458	0.7%
998	Leak Detector - Replace	12	$3,750	$313	0.1%
999	Meter Reader System - Replace	5	$3,500	$700	0.3%
46	Total Funded Components			$219,601	100.0%

Table 5: 30-Year Reserve Plan Summary 23247-1

Fiscal Year Start: 07/01/15

Interest:	1.0%	Inflation:	3.0%

Reserve Fund Strength Calculations

(All values as of Fiscal Year Start Date)

Projected Reserve Balance Changes

Year	Starting Reserve Balance	Fully Funded Balance	Percent Funded	Special Assmt Risk	Reserve Contribs.	Loans or Special Assmts	Interest Income	Reserve Expenses
2015	$644,423	$6,925,958	9.3%	High	$607,500	$0	$8,541	$196,000
2016	$1,064,464	$7,155,368	14.9%	High	$625,725	$0	$11,613	$442,591
2017	$1,259,211	$7,154,296	17.6%	High	$644,497	$0	$14,336	$308,775
2018	$1,609,269	$7,303,144	22.0%	High	$663,832	$0	$19,213	$57,368
2019	$2,234,946	$7,735,636	28.9%	High	$683,747	$0	$25,887	$0
2020	$2,944,579	$8,300,534	35.5%	Med	$704,259	$0	$30,516	$518,196
2021	$3,161,158	$8,278,024	38.2%	Med	$725,387	$0	$34,936	$92,539
2022	$3,828,942	$8,701,132	44.0%	Med	$747,148	$0	$42,098	$23,983
2023	$4,594,205	$9,215,648	49.9%	Med	$769,563	$0	$47,792	$443,370
2024	$4,968,190	$9,321,976	53.3%	Med	$792,650	$0	$52,918	$193,759
2025	$5,620,000	$9,697,189	58.0%	Med	$816,429	$0	$60,414	$28,894
2026	$6,467,949	$10,262,323	63.0%	Med	$840,922	$0	$57,622	$2,305,095
2027	$5,061,397	$8,509,044	59.5%	Med	$866,150	$0	$43,801	$2,268,742
2028	$3,702,607	$6,750,002	54.9%	Med	$892,134	$0	$30,202	$2,284,671
2029	$2,340,271	$4,931,457	47.5%	Med	$918,898	$0	$16,404	$2,333,623
2030	$941,950	$3,017,901	31.2%	Med	$946,465	$0	$14,131	$17,138
2031	$1,885,408	$3,443,181	54.8%	Med	$549,400	$0	$20,759	$187,366
2032	$2,268,202	$3,716,457	61.0%	Med	$565,882	$0	$22,034	$715,666
2033	$2,140,452	$3,464,671	61.8%	Med	$582,858	$0	$23,495	$186,246
2034	$2,560,559	$3,761,849	68.1%	Med	$600,344	$0	$28,563	$35,070
2035	$3,154,396	$4,235,207	74.5%	Low	$618,355	$0	$34,459	$66,826
2036	$3,740,383	$4,701,955	79.5%	Low	$636,905	$0	$39,467	$260,441
2037	$4,156,314	$4,995,538	83.2%	Low	$656,012	$0	$45,049	$0
2038	$4,857,376	$5,578,806	87.1%	Low	$675,693	$0	$51,775	$82,891
2039	$5,501,952	$6,107,197	90.1%	Low	$695,963	$0	$58,130	$127,050
2040	$6,128,996	$6,619,347	92.6%	Low	$716,842	$0	$60,824	$865,777
2041	$6,040,885	$6,399,767	94.4%	Low	$738,348	$0	$64,355	$8,087
2042	$6,835,500	$7,071,228	96.7%	Low	$760,498	$0	$72,272	$43,315
2043	$7,624,954	$7,741,182	98.5%	Low	$783,313	$0	$80,535	$0
2044	$8,488,802	$8,490,922	100.0%	Low	$806,812	$0	$82,465	$1,366,808

Table 6: 30-Year Income/Expense Detail (yrs 0 through 4) 23247-1

	Fiscal Year	2015	2016	2017	2018	2019
	Starting Reserve Balance	$644,423	$1,064,464	$1,259,211	$1,609,269	$2,234,946
	Annual Reserve Contribution	$607,500	$625,725	$644,497	$663,832	$683,747
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$8,541	$11,613	$14,336	$19,213	$25,887
	Total Income	$1,260,464	$1,701,802	$1,918,044	$2,292,314	$2,944,579
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$0	$0	$0	$0
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #2 - Replace	$0	$20,600	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$24,040	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$0
904	Well #2 Control - Replace	$0	$0	$0	$0	$0
904	Well #3 Control - Replace	$0	$0	$0	$0	$0
907	Filter System - Maintain/Replace	$0	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$0
911	Storage Tank, Concrete - Replace	$0	$0	$0	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$39,140	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$0	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$0	$0	$0
918	Reservoir Control System - Replace	$0	$0	$0	$0	$0
919	Telemetry System - Replace	$0	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$0	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$0	$0	$0
926	Treatment/Monitoring - Replace	$0	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$0
932	Booster System, Primary - Maintain	$0	$0	$0	$8,195	$0
934	Booster System, Back Up - Maintain	$0	$5,150	$0	$0	$0
	Distribution					
940	Water Main Line Project, B-Replace	$0	$334,750	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$265,225	$0	$0
940	Water Main Line Project, D-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$0	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$0	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 0 through 4) 23247-1

	Fiscal Year	2015	2016	2017	2018	2019
945	Remaining Main Lines, G - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$0
950	Hydrants - Add/Replace	$0	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$0	$0	$0
956	Water Meters, A - Replace	$0	$42,951	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$39,572	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$25,133	$0
957	Water Meter Setters, A - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$0	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$0
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$175,000	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$17,500	$0	$0	$0	$0
998	Leak Detector - Replace	$0	$0	$3,978	$0	$0
999	Meter Reader System - Replace	$3,500	$0	$0	$0	$0
	Total Expenses	$196,000	$442,591	$308,775	$57,368	$0
	Ending Reserve Balance:	$1,064,464	$1,259,211	$1,609,269	$2,234,946	$2,944,579

Table 6: 30-Year Income/Expense Detail (yrs 5 through 9) 23247-1

	Fiscal Year	2020	2021	2022	2023	2024
	Starting Reserve Balance	$2,944,579	$3,161,158	$3,828,942	$4,594,205	$4,968,190
	Annual Reserve Contribution	$704,259	$725,387	$747,148	$769,563	$792,650
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$30,516	$34,936	$42,098	$47,792	$52,918
	Total Income	$3,679,354	$3,921,481	$4,618,188	$5,411,560	$5,813,758
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$53,732	$0	$0	$0
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$26,095
901	Well Pump/Motor #2 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$0	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$16,310
904	Well #2 Control - Replace	$0	$0	$0	$0	$0
904	Well #3 Control - Replace	$0	$0	$0	$0	$0
907	Filter System - Maintain/Replace	$0	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$0
911	Storage Tank, Concrete - Replace	$0	$0	$0	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$0	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$0	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$0	$0	$0
918	Reservoir Control System - Replace	$0	$0	$0	$0	$0
919	Telemetry System - Replace	$4,057	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$0	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$14,758	$0	$0
926	Treatment/Monitoring - Replace	$0	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$137,001
932	Booster System, Primary - Maintain	$0	$0	$9,224	$0	$0
934	Booster System, Back Up - Maintain	$5,796	$0	$0	$0	$6,524
	Distribution					
940	Water Main Line Project, B-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, D-Replace	$347,782	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$443,370	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$0	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 5 through 9) 23247-1

	Fiscal Year	2020	2021	2022	2023	2024
945	Remaining Main Lines, G - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$0
950	Hydrants - Add/Replace	$156,502	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$0	$0	$0
956	Water Meters, A - Replace	$0	$0	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$0	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, A - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$0	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$0
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$0	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$38,807	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$7,829
996	Truck - Replace	$0	$0	$0	$0	$0
998	Leak Detector - Replace	$0	$0	$0	$0	$0
999	Meter Reader System - Replace	$4,057	$0	$0	$0	$0
	Total Expenses	$518,196	$92,539	$23,983	$443,370	$193,759
	Ending Reserve Balance:	$3,161,158	$3,828,942	$4,594,205	$4,968,190	$5,620,000

Table 6: 30-Year Income/Expense Detail (yrs 10 through 14) 23247-1

	Fiscal Year	2025	2026	2027	2028	2029
	Starting Reserve Balance	$5,620,000	$6,467,949	$5,061,397	$3,702,607	$2,340,271
	Annual Reserve Contribution	$816,429	$840,922	$866,150	$892,134	$918,898
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$60,414	$57,622	$43,801	$30,202	$16,404
	Total Income	$6,496,843	$7,366,493	$5,971,349	$4,624,942	$3,275,573
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$0	$64,159	$0	$0
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #2 - Replace	$0	$27,685	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$32,308	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$0
904	Well #2 Control - Replace	$0	$0	$0	$0	$0
904	Well #3 Control - Replace	$0	$0	$0	$0	$0
907	Filter System - Maintain/Replace	$0	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$0
911	Storage Tank, Concrete - Replace	$0	$0	$0	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$52,601	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$98,281	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$0	$0	$0
918	Reservoir Control System - Replace	$0	$0	$0	$0	$0
919	Telemetry System - Replace	$0	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$0	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$0	$0	$0
926	Treatment/Monitoring - Replace	$24,190	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$0
932	Booster System, Primary - Maintain	$0	$10,382	$0	$0	$0
934	Booster System, Back Up - Maintain	$0	$0	$0	$7,343	$0
	Distribution					
940	Water Main Line Project, B-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, D-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$0	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$2,116,148	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 10 through 14) 23247-1

	Fiscal Year	2025	2026	2027	2028	2029
945	Remaining Main Lines, G - Replace	$0	$0	$2,179,632	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$2,245,021	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$2,312,372
950	Hydrants - Add/Replace	$0	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$0	$0	$0
956	Water Meters, A - Replace	$0	$0	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$0	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, A - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$0	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$15,580
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$0	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$24,951	$0	$0
998	Leak Detector - Replace	$0	$0	$0	$0	$5,672
999	Meter Reader System - Replace	$4,704	$0	$0	$0	$0
	Total Expenses	$28,894	$2,305,095	$2,268,742	$2,284,671	$2,333,623
	Ending Reserve Balance:	$6,467,949	$5,061,397	$3,702,607	$2,340,271	$941,950

Table 6: 30-Year Income/Expense Detail (yrs 15 through 19) 23247-1

	Fiscal Year	2030	2031	2032	2033	2034
	Starting Reserve Balance	$941,950	$1,885,408	$2,268,202	$2,140,452	$2,560,559
	Annual Reserve Contribution	$946,465	$549,400	$565,882	$582,858	$600,344
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$14,131	$20,759	$22,034	$23,495	$28,563
	Total Income	$1,902,546	$2,455,568	$2,856,118	$2,746,805	$3,189,466
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$0	$0	$76,609	$0
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #2 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$0	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$0
904	Well #2 Control - Replace	$0	$0	$0	$0	$21,919
904	Well #3 Control - Replace	$0	$0	$0	$0	$0
907	Filter System - Maintain/Replace	$0	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$0
911	Storage Tank, Concrete - Replace	$0	$0	$198,342	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$0	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$0	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$197,515	$0	$0
918	Reservoir Control System - Replace	$0	$0	$0	$0	$0
919	Telemetry System - Replace	$0	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$57,850	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$19,834	$0	$0
926	Treatment/Monitoring - Replace	$0	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$0
932	Booster System, Primary - Maintain	$11,685	$0	$0	$0	$13,151
934	Booster System, Back Up - Maintain	$0	$0	$8,264	$0	$0
	Distribution					
940	Water Main Line Project, B-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, D-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$0	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$0	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 15 through 19) 23247-1

	Fiscal Year	2030	2031	2032	2033	2034
945	Remaining Main Lines, G - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$0
950	Hydrants - Add/Replace	$0	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$61,238	$0	$0
956	Water Meters, A - Replace	$0	$66,916	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$61,651	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$39,156	$0
957	Water Meter Setters, A - Replace	$0	$120,449	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$110,972	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$70,481	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$0
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$0	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
998	Leak Detector - Replace	$0	$0	$0	$0	$0
999	Meter Reader System - Replace	$5,453	$0	$0	$0	$0
	Total Expenses	$17,138	$187,366	$715,666	$186,246	$35,070
	Ending Reserve Balance:	$1,885,408	$2,268,202	$2,140,452	$2,560,559	$3,154,396

Table 6: 30-Year Income/Expense Detail (yrs 20 through 24) 23247-1

	Fiscal Year	2035	2036	2037	2038	2039
	Starting Reserve Balance	$3,154,396	$3,740,383	$4,156,314	$4,857,376	$5,501,952
	Annual Reserve Contribution	$618,355	$636,905	$656,012	$675,693	$695,963
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$34,459	$39,467	$45,049	$51,775	$58,130
	Total Income	$3,807,209	$4,416,755	$4,857,376	$5,584,843	$6,256,046
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$0	$0	$0	$91,476
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #2 - Replace	$0	$37,206	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$43,419	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$0
904	Well #2 Control - Replace	$0	$0	$0	$0	$0
904	Well #3 Control - Replace	$0	$0	$0	$24,670	$0
907	Filter System - Maintain/Replace	$0	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$0
911	Storage Tank, Concrete - Replace	$0	$0	$0	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$70,691	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$132,081	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$0	$0	$0
918	Reservoir Control System - Replace	$54,183	$0	$0	$0	$0
919	Telemetry System - Replace	$6,321	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$0	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$0	$0	$0
926	Treatment/Monitoring - Replace	$0	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$0
932	Booster System, Primary - Maintain	$0	$0	$0	$14,802	$0
934	Booster System, Back Up - Maintain	$0	$9,301	$0	$0	$0
	Distribution					
940	Water Main Line Project, B-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, D-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$0	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$0	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 20 through 24) 23247-1

	Fiscal Year	2035	2036	2037	2038	2039
945	Remaining Main Lines, G - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$0
950	Hydrants - Add/Replace	$0	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$0	$0	$0
956	Water Meters, A - Replace	$0	$0	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$0	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, A - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$0	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$0
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$0	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$11,162	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$35,574
998	Leak Detector - Replace	$0	$0	$0	$0	$0
999	Meter Reader System - Replace	$6,321	$0	$0	$0	$0
	Total Expenses	$66,826	$260,441	$0	$82,891	$127,050
	Ending Reserve Balance:	$3,740,383	$4,156,314	$4,857,376	$5,501,952	$6,128,996

Table 6: 30-Year Income/Expense Detail (yrs 25 through 29) 23247-1

	Fiscal Year	2040	2041	2042	2043	2044
	Starting Reserve Balance	$6,128,996	$6,040,885	$6,835,500	$7,624,954	$8,488,802
	Annual Reserve Contribution	$716,842	$738,348	$760,498	$783,313	$806,812
	Recommended Special Assessments	$0	$0	$0	$0	$0
	Interest Earnings	$60,824	$64,355	$72,272	$80,535	$82,465
	Total Income	$6,906,662	$6,843,587	$7,668,270	$8,488,802	$9,378,080
#	Component					
	Capacity/Filter					
106	Water System Plan - Update	$0	$0	$0	$0	$0
901	Well Pump/Motor #1 - Replace	$0	$0	$0	$0	$47,131
901	Well Pump/Motor #2 - Replace	$0	$0	$0	$0	$0
901	Well Pump/Motor #3 - Replace	$0	$0	$0	$0	$0
904	Well #1 Control - Replace	$0	$0	$0	$0	$0
904	Well #2 Control - Replace	$0	$0	$0	$0	$0
904	Well #3 Control - Replace	$0	$0	$0	$0	$0
907	Filter System - Maintain/Replace	$219,847	$0	$0	$0	$0
	Store/Monitor					
910	Storage Tank, Steel - Replace	$0	$0	$0	$0	$1,060,454
911	Storage Tank, Concrete - Replace	$0	$0	$0	$0	$0
914	Storage Tank, Exterior - Recoat	$0	$0	$0	$0	$0
915	Storage Tank, Exterior-Blast/Recoat	$0	$0	$0	$0	$0
916	Storage Tank, Interior-Blast/Recoat	$0	$0	$0	$0	$0
918	Reservoir Control System - Replace	$0	$0	$0	$0	$0
919	Telemetry System - Replace	$0	$0	$0	$0	$0
	Treatment/Boost					
920	Hypochlorite Generator - Replace	$0	$0	$0	$0	$0
922	Hypochlorite Cells - Replace	$0	$0	$26,655	$0	$0
926	Treatment/Monitoring - Replace	$0	$0	$0	$0	$0
930	Booster System, Primary - Replace	$0	$0	$0	$0	$247,439
932	Booster System, Primary - Maintain	$0	$0	$16,660	$0	$0
934	Booster System, Back Up - Maintain	$10,469	$0	$0	$0	$11,783
	Distribution					
940	Water Main Line Project, B-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, C-Replace	$0	$0	$0	$0	$0
940	Water Main Line Project, D-Replace	$628,133	$0	$0	$0	$0
940	Water Main Line Project, E-Replace	$0	$0	$0	$0	$0
941	Water Main Line Project, A-Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, F- Replace	$0	$0	$0	$0	$0

Table 6: 30-Year Income/Expense Detail (yrs 25 through 29) 23247-1

	Fiscal Year	2040	2041	2042	2043	2044
945	Remaining Main Lines, G - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, H - Replace	$0	$0	$0	$0	$0
945	Remaining Main Lines, I - Replace	$0	$0	$0	$0	$0
950	Hydrants - Add/Replace	$0	$0	$0	$0	$0
955	Pressure Reducing Valves - Replace	$0	$0	$0	$0	$0
956	Water Meters, A - Replace	$0	$0	$0	$0	$0
956	Water Meters, B - Replace	$0	$0	$0	$0	$0
956	Water Meters, C - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, A - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, B - Replace	$0	$0	$0	$0	$0
957	Water Meter Setters, C - Replace	$0	$0	$0	$0	$0
	Buildings/Site					
964	Building Roof - Replace	$0	$0	$0	$0	$0
970	Chain Link Fence - Replace	$0	$0	$0	$0	$0
	Systems/Equipment					
980	Generator, 200 KW - Upgrade	$0	$0	$0	$0	$0
994	Compact Tractor/Loader - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
996	Truck - Replace	$0	$0	$0	$0	$0
998	Leak Detector - Replace	$0	$8,087	$0	$0	$0
999	Meter Reader System - Replace	$7,328	$0	$0	$0	$0
	Total Expenses	$865,777	$8,087	$43,315	$0	$1,366,808
	Ending Reserve Balance:	$6,040,885	$6,835,500	$7,624,954	$8,488,802	$8,011,272

Accuracy, Limitations, and Disclosures

Washington disclosures, per RCW:

This reserve study should be reviewed carefully. It may not include all common and limited common element components that will require major maintenance, repair or replacement in future years, and may not include regular contributions to a reserve account for the cost of such maintenance, repair, or replacement. The failure to include a component in a reserve study, or to provide contributions to a reserve account for a component, may, under some circumstances, require you to pay on demand as a special assessment your share of common expenses for the cost of major maintenance, repair or replacement of a reserve component.

Because we have no control over future events, we do not expect that all the events we anticipate will occur as planned. We expect that inflationary trends will continue, and we expect Reserve funds to continue to earn interest, so we believe that reasonable estimates for these figures are much more accurate than ignoring these economic realities. We can control measurements, which we attempt to establish within 5% accuracy through a combination of on-site measurements, drawings, and satellite imagery. The starting Reserve Balance and interest rate earned on deposited Reserve funds that you provided to us were considered reliable and were not confirmed independently. We have considered the association's representation of current and historical Reserve projects reliable, and we have considered the representations made by its vendors and suppliers to also be accurate and reliable. Component Useful Life, Remaining Useful Life, and Current Cost estimates assume a stable economic environment and lack of natural disasters.

Because the physical condition of your components, the association's Reserve balance, the economic environment, and legislative environment change each year, this Reserve Study is by nature a "one-year" document. Because a long-term perspective improves the accuracy of near-term planning, this Report projects expenses for the next 30 years. It is our recommendation and that of the Financial Accounting Standards Board (FASB) that your Reserve Study be updated each year as part of the annual budget process.

Association Reserves WA, LLC and its associates have no ownership, management, or other business relationships with the client other than this Reserve Study engagement. James D. Talaga R.S., company president, is a credentialed Reserve Specialist (#66). All work done by Association Reserves WA, LLC is performed under his Responsible Charge. There are no material issues to our knowledge that have not been disclosed to the client that would cause a distortion of the association's situation.

Component quantities indicated in this Report were found in prior Reserve Studies unless otherwise noted. No destructive or intrusive testing was performed. This Report and this site inspection were accomplished only for Reserve budget purposes (to help identify and address the normal deterioration of properly built and installed components with predictable life expectancies). The Funding Plan in this Report was developed using the cash-flow methodology to achieve the specified Funding Objective.

Association Reserves' liability in any matter involving this Reserve Study is limited to our Fee for services rendered.

Terms and Definitions

BTU	British Thermal Unit (a standard unit of energy)
DIA	Diameter
GSF	Gross Square Feet (area). Equivalent to Square Feet
GSY	Gross Square Yards (area). Equivalent to Square Yards
HP	Horsepower
LF	Linear Feet (length)

Effective Age: The difference between Useful Life and Remaining Useful Life. Note that this is not necessarily equivalent to the chronological age of the component.

Fully Funded Balance (FFB): The value of the deterioration of the Reserve Components. This is the fraction of life "used up" of each component multiplied by its estimated Current Replacement. While calculated for each component, it is summed together for an association total.

FFB = (Current Cost X Effective Age) / Useful Life

Inflation: Cost factors are adjusted for inflation at the rate defined in the Executive Summary and compounded annually. These increasing costs can be seen as you follow the recurring cycles of a component on Table 6.

Interest: Interest earnings on Reserve Funds are calculated using the average balance for the year (taking into account income and expenses through the year) and compounded monthly using the rate defined in the Executive Summary. Annual interest earning assumption appears in the Executive Summary.

Percent Funded: The ratio, at a particular point in time (the first day of the Fiscal Year), of the actual (or projected) Reserve Balance to the Fully Funded Balance, expressed as a percentage.

Remaining Useful Life (RUL): The estimated time, in years, that a common area component can be expected to continue to serve its intended function.

Useful Life (UL): The estimated time, in years, that a common area component can be expected to serve its intended function.

Component Details

The primary purpose of the photographic appendix is to provide the reader with the basis of our funding assumptions resulting from our physical analysis and subsequent research. The photographs herein represent a wide range of elements that were observed and measured against National Reserve Study Standards to determine if they meet the criteria for reserve funding.

1) Common area maintenance, repair & replacement responsibility.
2) Components must have a limited life
3) Life limit must be predictable
4) Above a minimum threshold cost (board's discretion – typically ½ to 1% of annual operating expenses).

Some components are recommended for reserve funding, while others are not. The components that meet these criteria in our judgment are shown with corresponding maintenance, repair or replacement cycles to the left of the photo (UL = Useful Life or how often the project is expected to occur, RUL = Remaining Useful Life or how many years from our reporting period) and a representative market cost range termed "Best Cost" and "Worst Cost" below the photo. There are many factors that can result in a wide variety of potential costs, we are attempting to represent a market average for budge purposes. Where there is no UL, the component is expected to be a one-time expense. Where no pricing, the component deemed inappropriate for Reserve Funding.

Comp # : 102 **Loans - Payoff** Quantity: Significant principals

Location : Interfund and Washington State loans

Funded? : No Annual cost best handled as operating expense

History :

Evaluation : Water system received $336,560 loan from the State (Department of Community, Trade and Economic Development) on 5.15.2001 at 1.5% APR with payoff due by 10.1.2021. Proceeds were utilized to help pay for chlorination / filtration improvements. Also, another $112,000 loan was previously received from HOA general reserves to pay for 2012 water reservoir interior refurbishing. No impact upon water system maintenance reserves is factored for either of these debt obligations since BOD indicates payments from water system operating funds and not reserve monies.

Useful Life:

Remaining Life:

Best Case: Worst Case:

Cost Source:

Comp # : 106 **Water System Plan - Update** Quantity: Every 6 years

Location : Community water system

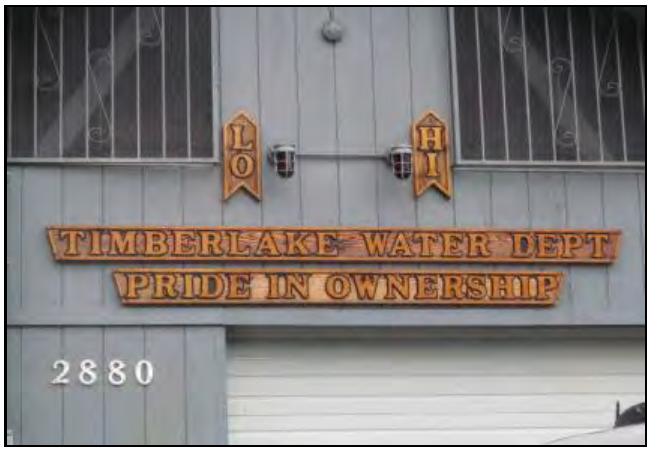
Funded? : Yes Meets National Reserve Study Standards criteria for Reserve Funding

History : FY 2014/2015 and FY 2015/2016 anticipated total expense of $44,000

Evaluation : The state of Washington requires Group A water systems to cause the preparation of a comprehensive Water System Plan to be prepared every six years. Updating of plan was ongoing as our report was written in early 2015 but WSP will not be complete for months into the future. Adjust component assumptions for future reserve study updates once expert analysis is complete and as conditions merit. Approval of the previous plan by CHS Engineers, LLC, Bellevue, Washington was in 5/2010. Expenses for that report from 2007-2010 were ~$40,000. FY 2014/2015 and FY 2015/2016 anticipated expense of $44,000 (total monies already paid and / or earmarked). Such significant cyclical future funding needs are factored for the plan going forward.

Useful Life:
6 years

Remaining Life:
6 years



Best Case: $40,000 Worst Case: $50,000

Lower estimate to update plan Higher estimate to update plan

Cost Source: Client Cost History/Estimate Provided by Client

Comp # : 113 **Sanitary Survey - Update** Quantity: Every 5 years

Location : Water system components

Funded? : No Cost projected to be too small

History :

Evaluation : This component would otherwise factor cyclical funding for the Washington State required water system sanitary survey, historically every five years for your community. Expense of only ~$800 in 2012. Expense may increase incrementally but small expenses under $3,000 are not suitable for reserve funding.

Useful Life:

Remaining Life:

Best Case: Worst Case:

Cost Source:

Comp # : 900 **Wells - Replace** Quantity: (2) active (1) reserve

Location : In the vicinity of 2880 East Timberlake Drive West

Funded? : No Useful life not predictable or extended

History : Well #1 was drilled in 1967 (currently a non-active reserve), Well #2 in 1971 and Well # 3 was drilled in 2001

Evaluation : There are three wells on the property. Well #1 was drilled in 1967 (currently a non-active reserve), Well #2 in 1971 and Well # 3 was drilled in 2001 at an expense of ~$56,000 but water usage reportedly only began in 2008. Detailed information about background, depth, supply, etc… can be found within the Comprehensive Water System Plan by CHS Engineers, LLC (dated August 2009 and April 2010). The water system plan details current and future projected water needs. Information within that plan and our previous research did not indicate any predictable time frame for the need to drill a new well within the current water system planning period which ends in 2026. WSP currently being updated will reconsider such potential needs. Note that without any known deficiencies of aquifer, service life of wells can be very extended, sometimes 80 years or more. As the community ages and your comprehensive plan is updated frequently, begin accruing reserve funds to replace / add any wells when future needs are confirmed or useful life is projected to be less than 30 years and update your long term budget accordingly.

Useful Life:

Remaining Life:

Best Case: Worst Case:

Cost Source:

Comp # : 901 **Well Pump/Motor #1 - Replace** Quantity: (1) 25 HP submersible 6"

Location : Pump house adjacent to Watershed, 2880 East Timberlake Drive West

Funded? : Yes Meets National Reserve Study Standards criteria for Reserve Funding

History : Reportedly replaced last in 2004

Evaluation : Well #1 has reduced capacity and is now considered an additional point of withdrawal. Grundfos pump was reportedly replaced last in 2004; no cost history was provided. Regular testing and inspection should be factored within the operating and maintenance budget. For planning purposes, we have assumed an extended 20 year useful life below due to stand-by status of this unit.

Useful Life:
20 years

Remaining Life:
9 years

Best Case: $18,000 Worst Case: $22,000

Lower estimate to replace pump/motor Higher estimate to replace pump/motor

Cost Source: ARI Cost Database: Similar Project Cost History

Comp # : 901 **Well Pump/Motor #2 - Replace** Quantity: (1) 25 HP submersible 6"

Location : 700' SE of Well #1

Funded? : Yes Meets National Reserve Study Standards criteria for Reserve Funding

History : Reportedly replaced last in 2004

Evaluation : Peerless pump was also replaced last in 2004. No reported problems at present but anticipate replacement at anytime since typical useful life projection is between 7-10 years for fully operational system. Minor repairs / replacements (below $3,000) of miscellaneous valves, piping, hardware, etc… should be considered maintenance items.

Useful Life:
10 years

Remaining Life:
1 years

Best Case: $18,000 Worst Case: $22,000

Lower estimate to replace pump/motor Higher estimate to replace pump/motor

Cost Source: ARI Cost Database: Similar Project Cost History