West Beach Road Association

Community Water System

Operations and Maintenance Manual

The well comes to the surface in the covered area in the foreground. The Reservoir tank is shown on the left with the control systems in the building on the right. This view is to the east with West Beach Road in the background.

This update August 2020

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INTRODUCTION

Welcome to our West Beach Road Association community water system. This Operations and Maintenance Manual was prepared in accordance with Washington Administrative Code (WAC) 246-290-415, as a component of our Small Water System Management Program (SWSMP) which is required by WAC 246-290-105. *

The purpose of this O & M Manual is to ensure that our system is capable of supplying an adequate quantity and quality of water at all times and is arranged so that all of the information necessary to operate and maintain the system is located in one place. While this Manual will always be kept in our Pump House as a ready reference, the SWSMP itself will be retained by our association's appointed Chairman for Water System Operations.** The SWSMP is a "living document" and must include a number of documents that are updated periodically.

In 1994, the Washington State Department of Health (DOH) acknowledged our water system to have adequate capacity for 25 residential service connections. A copy of this document is in our SWSMP. We have only 23 build-able parcels and currently (2016) have 21 connections.

Having more than 14 residential water connections, our system is classified by the Federal Environmental Protection Agency and the Washington State Department of Health (DOH) as a Group A Community Water System and, as such, receives a DOH Sanitary Survey (i.e., an inspection) every five years. A careful review of this O & M Manual is an important feature of these surveys. The DOH reviews our compliance with the WAC annually and issues a Permit to continue operating. The permit is in our SWSMP and a copy is posted in our Pump House.

WAC 246-290-415 provides that the following elements be included in an "O & M Program": a) Water system management and personnel; b) Operator certification; c) Comprehensive contaminates monitoring plan; d) Emergency response; e) Cross-connection control; f) Maintenance of service reliability.

All of these elements are treated in depth in our SWSMP and, while they are addressed briefly herein, this Manual will focus mainly on descriptions of the facilities and equipment that comprise our water system. The descriptions are supported by photos and explanations of operating and maintenance procedures and are intended to provide all the information needed to understand, operate and maintain the system.

The ground water system (PWS ID # 17970E) was designed and constructed in 1984 and is owned and operated by the West Beach Road Association (WBRA).

The system was classified as a Group A Community Water System (serving more than 14 connections) in accordance with Washington Administrative Code (WAC) 246-290 and approved for service of 25 residential service connections by the Washington State Department of Health on June 20, 1994. Ownership of the system was transferred from the original developers to the Association on August 21, 1998.

The well, reservoir tank and pump house of the WBRA water system occupy a tax-exempt parcel of 6,600 sq. ft. (# RO 3224-353-3711) with an easement and gated access to the West Beach Road. The system presently includes about 2,500 feet of distribution piping (6 inch PVC), three fire hydrants and 21 residential water service meters. The piping, hydrants and meters are all situated on land owned in common by the Association.

A new water treatment system for removal of Iron and Manganese was installed in December, 2015 and given final approval by the Washington State Department of Health on February 2, 2016. The well screen was brushed and bailed and a new well pump, down pipe and level sounding tube were installed on March 11, 2016.

Responsibility for conveying safe drinking water from the system to members of the Association as well as the economical operation and maintenance of the system is vested in the Board of Directors of the Association. In accordance with WAC 246-292, the WBRA Group A water system is professionally operated by a State-certified water system operator, King Water Company of Coupeville, WA. The President of the Board of Directors, with the authority of WBRA Bylaws (Article V, Section

10), on June 30, 2014, appointed a Chairman for Water System Operations. The responsibilities of the Chairman include supervision of the contract performance of King Water Company.

In accordance with WAC 246-290-415, the Chairman for Water System Operations and King Water Company have prepared and will maintain this Operations and Maintenance Manual which will be kept in the pump house.

*Copies of the applicable Codes can be found in the Appendices.

SYSTEM COMPONENTS

GENERAL DESCRIPTION OF OUR SYSTEM

The source of water for our WBRA water system is the aquifer that serves most of the residents of Whidbey Island and our system is therefore classified as a “ground water system” as opposed to a “surface water system” which would depend upon a river or lake for its source. The aquifer is fed by rain water and has many branches and is found at many different depths within the glacial till that characterizes the geology of Whidbey Island.

Our access to the local branch of the aquifer is a well dug in 1984 to the depth of 287 feet. The static water level was measured at 212 feet and has not changed. This means that our portion of the aquifer has continued to recharge despite the demands that our community as placed on it. The Chloride measured in the water was 59 milligrams per liter and has not changed. This means that, although our well is within 2,000 feet of the Strait of Juan de Fuca, salty sea water has not penetrated our portion of the aquifer. Both static water level and Chloride must be measured twice per year to determine the “health” of our well.*

Because our well is deep, bacteria and most contaminates found on the surface do not penetrate to our source, nevertheless, once the water is pumped to the surface and enters our water system it is vulnerable to contamination and, therefore, the WAC requires that it be tested on a regular schedule. * Our water does carry some naturally occurring and undesirable ingredients, especially Iron and Manganese. Our system filters out essentially all of these by treating the water with a Potassium Permanganate and Greensand Plus combination. Natural tannins do escape our filters as well as the Calcium content which is removed by household water softeners. Fortunately, our water contains only 6 parts per billion of Arsenic which is below the EPA limit of 10 parts per billion.

The cost of our well and the other components of our water system was $66,583 in 1984. This cost was borne by the original developers of our community who conveyed the system and the tax-exempt parcel on which it is principally located to the WBRA on August 21, 1998. The conveyance

document is in the SWSMP. The system is currently insured for $115,000 with the first National Insurance Company of America and the policy is in the SWSMP. The policy also provides product liability insurance for the water purveyed to our members and covers the Board of the WBRA for Errors and Omissions.

WAC 246-292 requires Group A water systems to employ a professional operator certified by Washington State and the duties of this operator include making required measurements and taking water samples for laboratory tests. WBRA employs the Satellite Management Agent (SMA) King Water Co. of Coupeville, WA. A copy of the contract with King Water Co. can be found in the SWSMP.

View of the West Beach Road Association's principal water system structures.

From left to right:

- the cinderblock well head enclosure which is protected by a locked aluminum cover
- (in the background) the 26,000-gallon concrete reservoir tank- NOTE the roof of the tank and the cap joint bear a heavy coating of waterproofing urethane (CIM 1000) professionally installed in September 2014.
- the small structure housing the association's 5.5 kW gasoline powered emergency generator- NOTE that fuel must not be stored in this structure!
- the 144 square foot Pump House containing the system's filters and 120gallon contact tank, the distribution pumps and the 805-gallon pressure tank and air compressor

NOTE that the roofs of the Pump House and the emergency generator structure were professionally covered with heavy-grade shingles in September 2015.

Housing for the large 8kW generator used for the downhole pump. This housing also contains gasoline to run the generators and is over 100 feet away from wellhead and pump house as required by law.

INVENTORY OF SYSTEM COMPONENTS (2016)

COMPONENTS	INSTALLED	CONDITION
PUMPS		
#1 Fire pump, 7.5 HP	1985	good
#2 Distribution pump, 5 HP	1995	good
#3 Distribution pump, 5 HP	2004	good
#4 Well pump, 3 HP	2016	new
#5 Booster pump, 1 HP	2000	good
Treatment chem. pump	2015	new
AIR COMPRESSOR		
1 @ 100 PSI	2011	good
GREENSAND FILTERS		
2 @ 10 – 12 gallons / min.	2015	new
TANKS		
Concrete reservoir tank	1985	good
Pressure tank, 805 gal.	1985	good
Contact tank, 120 gal.	2015	new
EMERGENCY GENERATORS		
1 @ 5.5 Kw	2003	new
1 @ 10 Kw	2012	good

WATER SYSTEM LOCATION & RESPONSIBILITIES

The well, pump house and reservoir tank of our water system occupy a tax-exempt parcel (#RO 3224-353-3711) on the west side of West Beach Road and the distribution lines, fire hydrants (3) and the water meters connecting to residential water systems (23) lay within the borders of three of our common-use private roads (Deseret Drive, Seacliff Lane and Iris Lane). *

The WBRA owns the water meters and is responsible for delivering safe water through the meters to the residential piping owned by the individual members. Our members are responsible for securing the safety of the water within their property boundaries.

Our State-certified water operator, King Water Co., reads the meters quarterly and reports on water usage to our Chairman for Water System Operations. The Chairman is responsible for checking individual residential usage for evidence of leaks (especially in homes that may be temporarily unoccupied). Once notified, it is the responsibility of the residence owner to find and correct the leak. King Water Co., in compliance with the DOH Water Use Efficiency Program, also monitors our whole water system for unaccounted expenditures and calculates and reports on water losses in an annual Water Quality Report (WQR) disseminated to all of our members as well as to the DOH. The most recent WQR can be found in our SWSMP.

The WBRA is also responsible, under local fire codes, for maintaining sufficient water reserved in our reservoir tank to provide 500 gallons per minute for 30 minutes (i.e., 15,000 gallons) for the purpose of suppressing fires. The reservoir tank holds nearly 26,000 gallons. Current (2020) normal peak daily usage is less than 5,000 gallons and the well pump turns ON automatically to refill the tank when that amount has been expended – thereby always leaving more than the required reserve in the tank. This ratio of daily usage to the capacity of the tank (about 1 to 5) allows for reasonable circulation of the water, thus reducing the chance of stagnation and the growth of bacteria within the tank.

The reservoir tank is vented through a fixture on the roof and the WBRA is responsible for ensuring that the fixture is covered in fine wire mesh to

prevent wind-blown contaminants from entering the tank. A small aperture in the roof through which a wire is passed that connects a float in the tank to the water level indicator on the outside of the tank must also be covered in fine wire mesh.

Maps and aerial photos of our water service area can be found in the Appendices

WATER SYSTEM OPERATIONS & EQUIPMENT

The operation of our water system is divided into two functional subsystems:

A. filling and treatment, and

B. storage and distribution.

THE FILLING AND TREATMENT SUBSYSTEM

An electrical sensor in the reservoir tank signals the submersible pump at the 273-foot depth (60 feet below the nominal water level) in the well to turn ON when the level of water in the tank drops below 8 feet. Another sensor signals the pump to turn OFF when the tank is refilled to the 10-foot level.

As a safety feature, another sensor signals if the water level drops below 6 feet (indicating either that the well pump cannot keep up with the rate of water usage or that the well pump has failed) and lights red lights on the exterior of the front of the Pump House. In the event that the well pump does not respond to the signal that the tank has been refilled water will flow through an overflow pipe on the outside of the tank and the water level indicator on the outside of the tank will drop to the red mark. All members of the WBRA have been instructed to alert the Chairman for Water System Operations and also King Water Co. if they observe either the red lights or the red overfill indicator. Telephone numbers for the Chairman and King Water Co. are posted on the front door of the Pump House.

When the water is pumped to the surface it is piped through a meter and a gate valve located in the well head enclosure and then underground to the north side of the Pump House where it enters through the floor and flows into the treatment system which captures its Iron and Manganese content. * These captured elements are back-flushed from the filters under digital controls that prevent the filters from becoming saturated. The back-flushed water is piped out of the Pump House and disposed of in the ditch alongside of West Beach Road.

The water from our well is bacteria-free and is not chlorinated.

The following pages show the arrangement of our above-ground facilities and the submersible well pump and motor, the well head enclosure with the well cap and vent pipe, the water meter, the gate valve (which functions to control the rate at which water enters the treatment system), and the electric box through which current flows from the Pump House to the well pump. There is also a photo of the piping through which the water enters the Pump House

*A complete description of the treatment system can be found in the Appendices.

View of the 25 gallon per minute 3 HP Franklin Electric (FPS 4400) submersible well pump and attached 230 volts, single phase, Franklin Electric motor prior to installation on March 11, 2016. The rate at which this pump draws water from the aquifer is controlled by the gate valve in the well head enclosure at less than 12 gallons per minute to match the optimum capacity of the two 21 inch filters and their Greensand media.

View of the well pump and motor assembly attached to the well pipe and the static water level measuring tube before insertion in the well case.

View of the top of the well case within the well head enclosure. The water proof electric cable passes through the white well cap and extends to the submersible well pump 273 feet below ground. The "U" shaped pipe is connected to the sounding tube that is attached to the well downpipe and provides a vent for the well. NOTE that it's open end must be protected by a fine mesh screen. The main water meter is in the foreground.

View of the interior of the well head enclosure showing the electric box through which power flows from the Pump House to the well pump, the socket box into which the heat tape that protects the exposed piping from freezing is plugged, the master water meter and the gate valve that controls the flow of water from the well to the Pump House. Note that the handle of the gate valve is painted green indicating that it is normally OPEN. This valve is also used to regulate the rate of flow (gallons per minute) through the filtration system so as not to overwhelm the beds of media. The iron cover is normally SHUT and locked.

View of the pipe and check valve through which the water pumped from the well enters the Pump House. The liquid potassium permanganate solution enters the flow of water just above the check valve.

Treatment

There are 5 components to the treatment system.

1. Chemical feeder
2. Static mixer
3. Contact tank
4. Filters
5. Backwash system

Chemical Feeders

There is one feed pump for potassium permanganate. The pump only operates when the well pump is on filling the reservoir. Flow from the pump is controlled by the Seametrics pulse meter.

Potassium permanganate feeder pump - P751-398SI

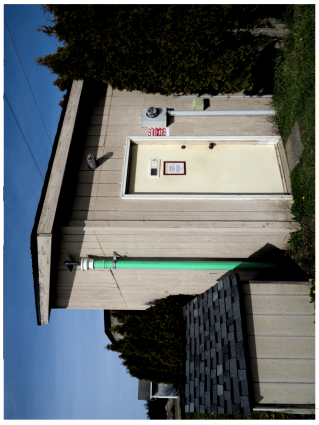
This is the yellow colored pump that feeds the potassium permanganate solution from a 35 gallon chemical tank. The solution is prepared by combining 1 ounce of powdered potassium permanganate with 1 gallon of water and mixing well. Sample taps are provided for pre filtration to ensure adequate oxidation levels of solution and post filtration to ensure complete oxidation- no residual potassium permanganate in the finished water.

Chemical pump settings:

1. Speed - external pulse input from Seametrics MJNR-100-4P-06 flow meter
2. Stroke- 40%

Maintenance for feeder pumps

Once a year the chemical feeder pumps should be completely disassembled and cleaned in a weak solution of water and muriatic acid. Diaphragms and check valves should be replaced as needed. These parts should be kept on hand and stored in the pump house.



WEST BEACH ROAD ASSOCIATION

PUMP HOUSE EQUIPMENT LAYOUT – PLAN VIEW

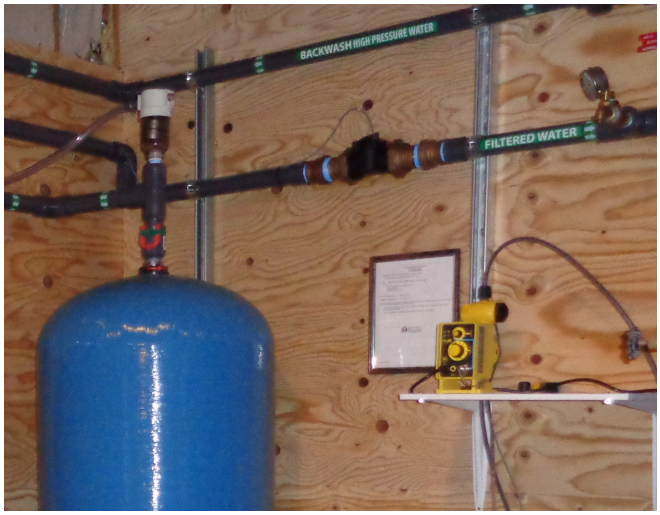
PIPING OFFSET FOR CLARITY. PIPING ROUTED ALONG INTERIOR PUMP HOUSE WALLS.

SEE SYSTEM SCHEMATIC PROVIDED ON SHEET C03 FOR ADDTIONAL DETAILS

View of the interior of the Pump House showing the two 21-inch x 62-inch Greensand filters, the 120 gallon contact tank, the yellow vat containing liquid potassium permanganate solution and the small yellow pump (on the shelf) that meters the solution into the stream of water coming from the well. All piping is marked to indicate the direction of flow and the status of the water within. Note the filters and contact tank are strapped to the wall to minimize movement in the event of an earthquake.

Potassium permanganate pump and vat and pre filtration sample tap.

Contact tank and metering pump



View of the piping manifold through which water from the well leaves the blue contact tank and enters the filters. Pressurized water from the distribution system also enters the filters through the manifold when they are back-flushed. Controlled by the digital instruments on the tops of the filters, the filtered water is sent on to the reservoir tank and, when back-flushing is ordered by the controllers, the pressurized water bearing minerals captured by the filters leaves the Pump House through the common discharge pipe near the ceiling. **Note** that the controllers are plugged into electrical sockets on the wall. Backwashing of the filters is sequenced so that one filter is always available to receive water from the well.

View of the interior of the Pump House showing the 21-inch Greensand filters, the system status board, the hose for draining the contact tank, the boxes (mounted on the back of the door) for the working log book and the Operations and Maintenance Manual. The vent in the door is kept open at all times for ventilation.

View of the green plastic pipe through which the water bearing the minerals captured by the filters is carried away from the Pump House when the filters are back-flushed. The pipe runs underground to the ditch along West Beach Road and leaves the pipe through an open spout. Note that there is an air gap between the black pipe emerging from the Pump House and the white bowl at the top of the green pipe. This prevents contaminants from migrating from the ditch back into the filters. The gray pipe next to the door protects the electric power lines that enter the Pump House through the meter at the top of the pipe. The small yellow box next to the gray pipe is the connection socket for the 10 kW emergency generator.

View of the 2-gallon regeneration vats, each of which is connected to the control head of a 21-inch filter. After each backwash, the filters draw the liquid potassium permanganate solution through the media inside the filter to ensure that the media is maintained adequately, and it is then flushed out to waste. These vats are automatically refilled with water at the end of each backwash cycle. They should be checked weekly and, if necessary, potassium permanganate powder should be replenished.

View of the discharge spout (in the background near the West Beach Road) for water back-flushed from the 21-inch Greensand filters. The two water meter covers in the foreground protect the meters on the two residential hook ups nearest to the Pump House. NOTE that all water meters are the property of the West Beach Road Association and are located either on the water system parcel owned by the association or along the road easements owned by the association.

NOTE: The tan color of the water flowing from the discharge spout bearing the iron and manganese captured by the filters.

WATER SYSTEM OPERATIONS & EQUIPMENT

THE STORAGE AND DISTRIBUTION SUBSYSTEM

After our water has been pumped to the surface by our well pump and treated by our Potassium Permanganate and Greensand Plus filtration equipment the pressure from the well pump moves it from the pump house via an underground pipe to a fill pipe within the reservoir tank. That pipe terminates just below the ceiling of the tank and the water sprays down to fill the reservoir, thus helping to aerate the water before it enters storage.

Ideally, the stored water will remain in the tank before it is distributed to our members no longer than a few days, thus limiting the risk of stagnation, especially in the warmer months. Air must be allowed to enter the tank through the vent on the roof so that water can be pumped out it. There is also a small hole in the roof for the wire connecting a float in the tank with the level marker on the outside. Both of these apertures are protected by fine wire mesh.

The aluminum hatch on the roof of the tank is kept locked (the key is in the pump house) and opened only when necessary for inspection, repairs or pressure washing the interior of the tank. These operations are strictly scheduled to minimize the risk of contaminates entering the tank.

The ON I OFF functions of the well pump are controlled by two electrodes that hang from the ceiling of the tank. Other electrodes control the red alarm lights on the south face of the pump house and also the safety OFF function for all distribution pumps in the event the water in the tank is exhausted.

There is an overflow pipe on the outside of the tank in case the well pump fails to respond to the OFF command. The open end of that pipe must be covered with fine wire mesh.

There is a one-foot-high silt stop above the suction hole in the bottom of the tank to prevent accumulated silt from entering the distribution system through the pumps. The silt stop prevents access to the lowest 2,500 gallons of water in the tank. There is an in-ground valve and a hose

connection next to the east side of the exterior of the tank for the purpose of draining all of the water out of the tank in preparation for periodic cleaning. The in-ground valve drains the tank from a different hole in the floor of the tank from the pump suction hole.

There is another in-ground valve between the reservoir tank and the pump house that provides for isolating the tank from the distribution pumps. Both in-ground valves have round metal covers. There is a 'T handle" wrench in the pump house to open and shut these valves.

Interior view of the reservoir tank showing the access ladder, and the fill pipe to the left of the ladder and the control electrodes for the well pump and red alarm systems.

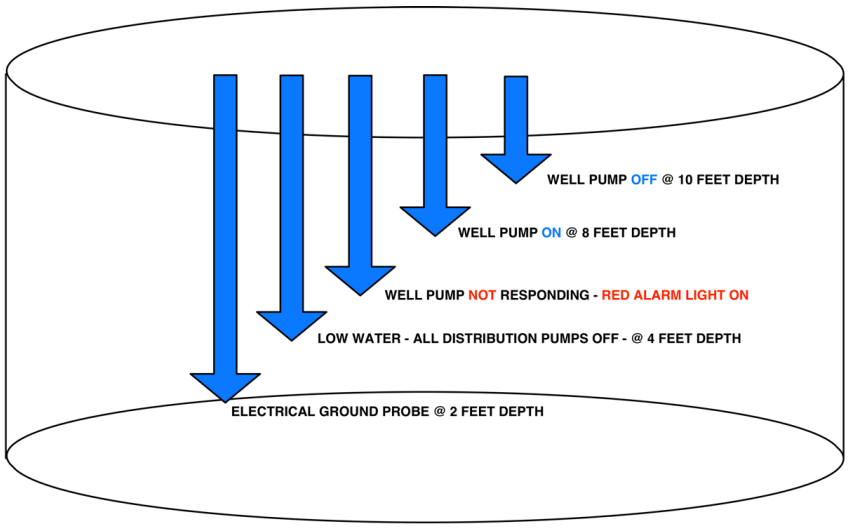
Interior view of the reservoir tank showing the white level indicator float, the file pipe, the ladder, and the one foot high silt stop.

View of the water level indicator on the reservoir tank. NOTE that the indicator shows the water level "upside down" with the maximum content of the tank (10 feet, 26,000 gallons) at the bottom. NOTE the red painted area at the bottom of the indicator. If the black marker is in this area it shows that the well pump did not turn off when the tank was filled and water is flowing from the overfill pipe on the exterior of the tank. The wire attached to the marker must be surrounded by fine mesh at the point where it comes out of the top of the tank to prevent contamination from entering the tank.

View of the aluminum cover for the access hatch and the electric conduit for the control electrodes.

NOTE: this photo was taken before the top of the tank was coated by black weatherproofing urethane.

View of the white overflow pipe on the exterior of the reservoir tank and also of the access to the buried tank drain valve and the white-capped hose connection used for removing all water from the tank in preparation for annual inspection and cleaning.Electrodes that control actions at water depths



Distribution of the water stored in the reservoir tank is accomplished by a battery of electric pumps that are controlled by pressure sensors at the top of the 805-gallon pressure tank in the pump house. A "bubble" of pressurized air is maintained within the top of the tank and 550 gallons of treated water is maintained in the tank for immediate response to demands from our members. These demands cause the pressure within the tank to drop as the air "bubble expands and the sensors signal the pumps to come ON to bring more water from the reservoir tank and to restore the pressure.

The distribution pumps are graduated in size to permit the most economical response to demands. The "normal duty" pump for responding to small demands is a one-horsepower (HP) Gould model JS 10 60 Hertz single phase pump. Unlike the other distribution pumps, it senses pressure in the distribution lines through a small diameter tube and its ON / OFF switch is in an attached AMTROL digital control box attached to the pump. The pressure in the distribution system can be readily seen on the face of this control box. There is also a visible pressure gauge at the top of the pressure tank.

Larger demands are met by one or both of the five-HP Gould model 3656 60 Hertz single phase centrifugal pumps. These.two pumps are sequenced electrically so that they alternate operations unless the demand is so large that both pumps must run in order to meet the demand and restore operating pressure in the pressure tank. The tank has an external sight glass for monitoring the action of the pumps.

The largest demand for water occurs when one or more fire hydrants are opened either to flush the distribution system or to extinguish a fire. This demand exceeds the capacities of the one-HP pump and both of the five-HP pumps. As system pressure drops below 35 psi one of the sensors at the top of the pressure tank activates the 7.5-HP fire pump. This pump will run until either the fire hydrant(s) are shut or all of the accessible the water in the reservoir tank has been expended (when a sensor in the reservoir tank will activate a relay that will turn all of the pumps OFF).

Approximately 2,500 feet of 6-inch diameter

PVC piping, buried three feet below the surface, conveys water from the pump house to each of the residences connected to the distribution system. The portion of this system for which the WBRA is responsible ends at the outlet side of the individual water meters and the one-inch piping that conveys water beyond and into residential properties is the responsibility of the property owners. *

Maps of the distribution system are in the Appendices.

View of the distribution header pipe from the pressure pumps to the pressure tank and the distribution line.

NOTE: the green valve handle (marked by red arrow). This valve controls the flow of water from the pumps and pressure tank and must be SHUT in the event of a rupture in the distribution lines — otherwise the pumps will react to the drop in pressure and drain all the water from the reservoir tank.

NOTE: the over pressure relief valve (set for 75 psi) and the white pipe (marked by yellow arrow) that permits water under excess pressure _to escape the pressure tank and exit the pump house.

View of the over pressure relief pipe (marked by red arrow) coming from the pressure tank on the outside of the northeast corner of the pump house. The open end of this pipe must be covered with fine wire mesh.

NOTE: the round metal cover (marked by blue arrow) for the valve that isolates the reservoir tank the inside of the pump house.

This valve is normally OPEN.

View of the dedicated water sample tap that was installed on the main distribution line about 50 feet east of the corner of Deseret Drive and Seacliff Lane on April 16, 2020. This tap will permit King Water to take monthly samples for the presence of bacteria without having to resort to any outside hose bibs at residences. The locked cover will protect the security of the spigot which will be sanitized before samples are taken.

View of the sample tap and the six-inch valve that was inserted into the main distribution line to provide a means of isolating the portion of the line that runs along Seacliff Lane which is near the high bluff. That portion is more vulnerable to damage that might be caused by an earthquake / tsunami than the portion along Deseret Drive. Also shown Is the standpipe that allows the valve to be accessed from the surface.

View of the juxtaposition of the main distribution line with the isolation valve installed and placement of the dedicated sample tap.

View of the completed installation of the temple trash and the access cap (immediately next to the road) for the isolation valve. Beneath the cap is a standpipe down which a T-handled tool can be attached to the stem of the isolation valve. The T-handled tool is kept in the pump house.

View of the 805-gallon pressure tank, the pressure switches at the top that regulate the action of distribution pumps #1, #2, and #3 and the air compressor that maintains the air "bubble" inside the top of the tank. A sight glass on the side of the tank indicates the water level inside the tank which can be compared to the normal operating level marked on the outside of the tank. Note the pressure tank is attached to the four corners of the Pump House by chain and steel wires to minimize movement in the event of an earthquake. Also shown is the fan that circulates air within the Pump House. The fan is controlled by a timer and is set to run for two hours every afternoon.

View of the electrical control boxes for, from left to right, the relays that sequence the action of the well pump and the distribution pumps and that turn ON I OFF the reservoir tank low level alarm light, the #1 (7.5 HP) fire pump, the #2 and #3 (5 HP) distribution pumps, the #4 (3 HP) well pump and the main and individual circuit breakers. Note that the starting capacitors for the pumps are attached to the pumps with the exception of those for the submersible well pump which are located in the box above the controls for the #3 an #4 pumps. This box has two buttons on its bottom that will reset the well pump if it has stopped running due to overheat.

The black wire that powers the #5 (one HP) distribution pump is coiled under the long horizontal connection box. It can be unplugged and plugged into a socket on the emergency generator in the event of loss of electric power. Note the one HP pump will satisfy most routine demands on the distribution system. It constantly senses the pressure in the distribution lines and automatically turns ON when the pressure falls to 51 psi and turns OFF when it has restored distribution pressure to 59 psi.

The ON and OFF pressures for the other distribution pumps are:

- Pump #1 ON @ 30 psi and OFF @ 35 psi
- Pump #2 ON @ 50 psi and OFF @ 59 psi
- Pump #3 ON @ 40 psi and OFF @ 59 psi

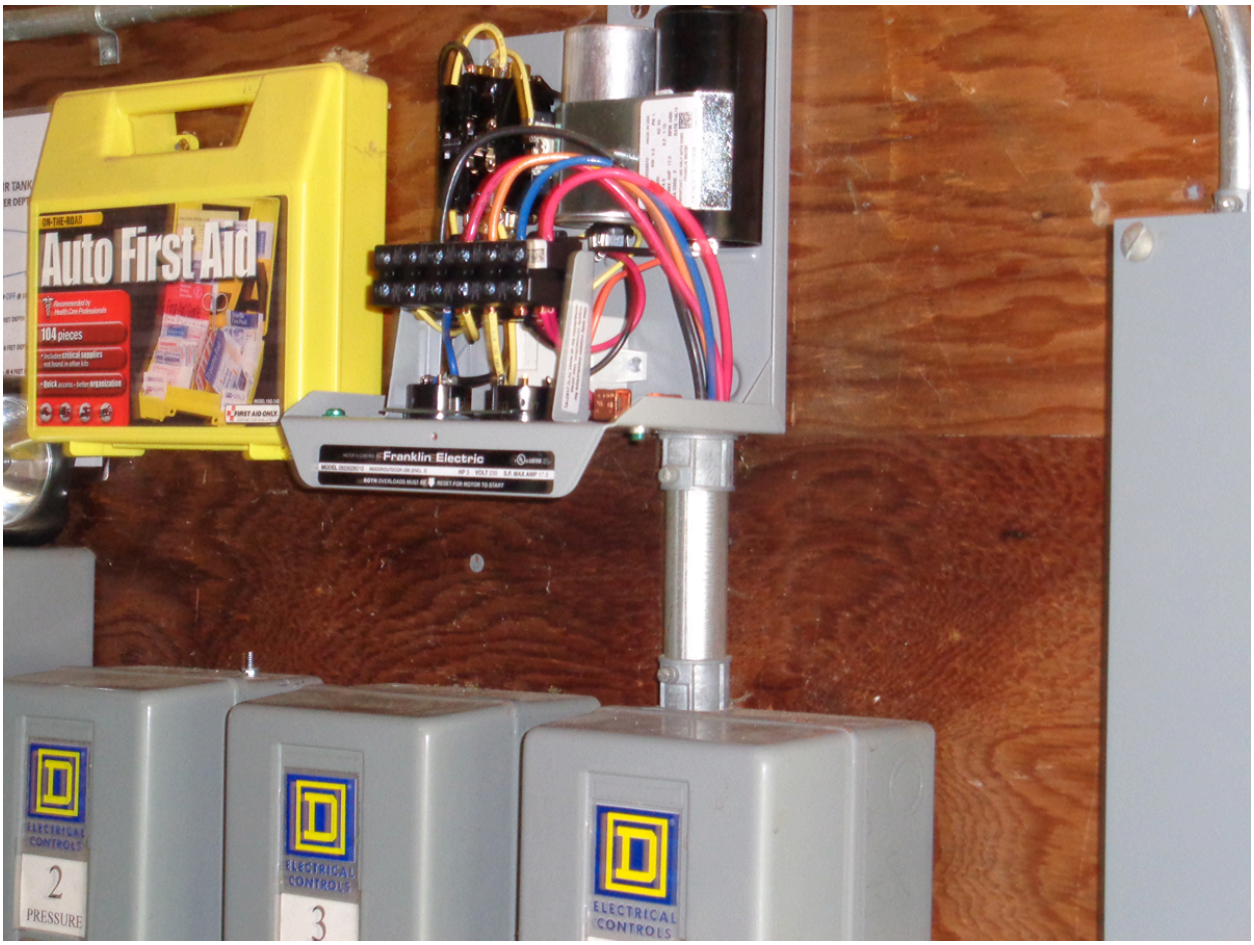
Note that pumps #2 and #3 are electrically set to rotate as "lead - lag" to equalize wear.

View of the distribution pump manifold. From top to bottom: the # 1 7.5 HP (fire) pump, the #2 5 HP distribution pump, the #3 5 HP distribution pump and the #5 one HP distribution pump.

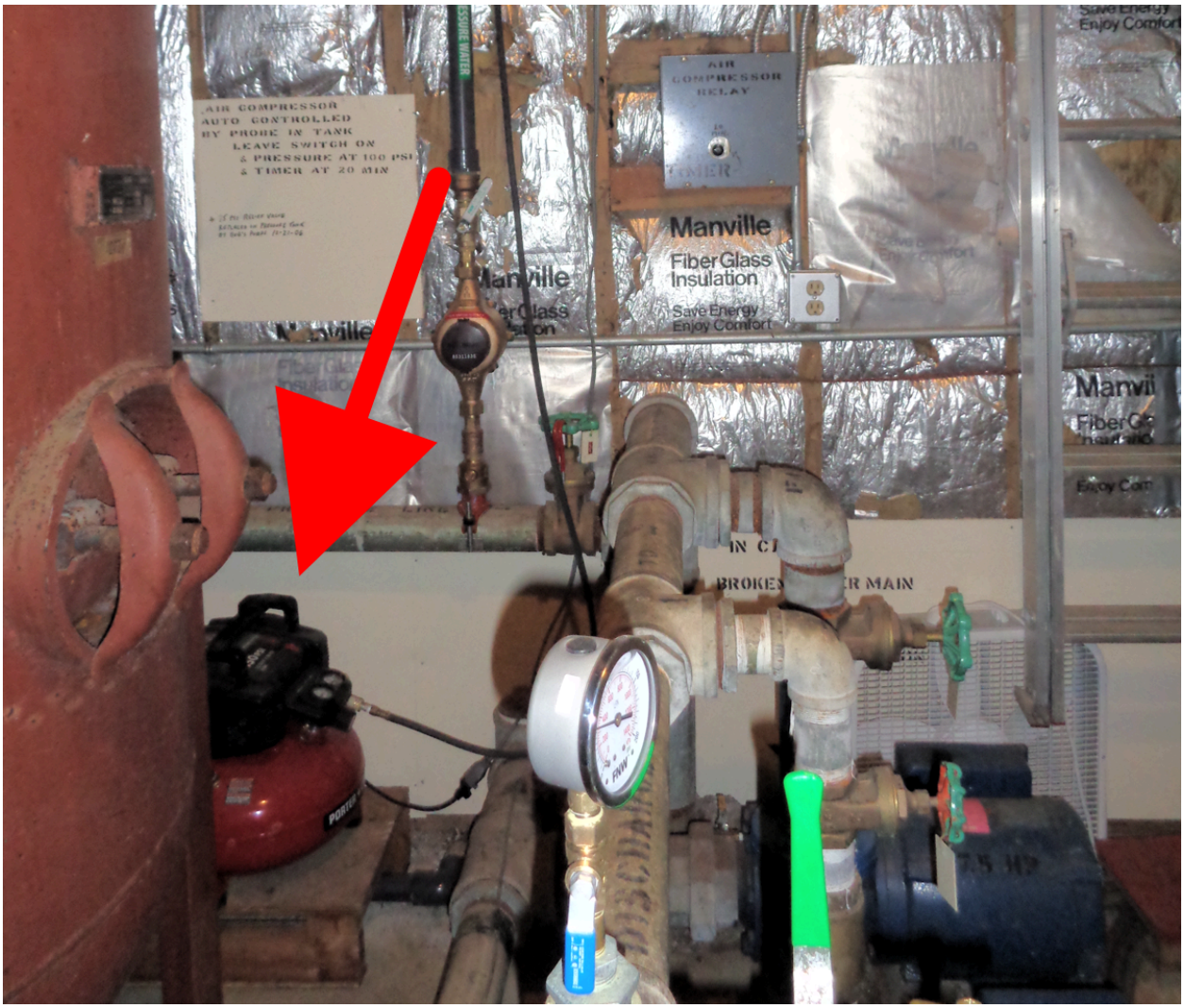
Note the system pressure line for the attached electrical controller for the #5 pump is plumbed to the discharge-to-distribution line. Pumps #1, #2, and #3 are controlled by pressure sensors located at the top of the red pressure tank.

The #4 pump is the 3 HP submersible pump in the well. It is controlled by sensors in the reservoir tank to turn ON when the water level falls below 8 feet and to turn OFF when the water level has returned to 10 feet. Note another sensor in the reservoir tank will turn ON the red alarm lights on the front of the Pump House if the water level in the reservoir tank falls below 6 feet. This might indicate a failure of the well pump to respond to the sensors. The lights will turn off when the water level is restored above 6

feet.The pump suction line from the reservoir tank is the lower of the horizontal pipes to the left of the pumps. The pump discharge line to the distribution system is the upper horizontal pipe. Note that the valves on the pipes entering and leaving the pumps are painted green, indicating that they are normally in the OPEN position. A hose bibcock is provided on the distribution line to test the quality of the water flowing to residential hook ups.



View of electrical control boxes for the submersible pump in the well. The upper box contains the starting capacitors for the pump and the lower box contains the switches that are operated manually from the face of the box cover: AUTO (pump ON or OFF depends on the action of the relay attached to the water level sensor in the reservoir tank); OFF; and ON. The upper box has two RESET buttons located on the bottom and the lower box has a RESET switch on the front cover.



View of the red air compressor and the air hose that is connected to the sensor in the pressure tank. The compressor is always in "STANDBY" electrically so that it can respond to a signal from the sensor to add pressure to the "bubble" at the top of the pressure tank. Note that instructions for the operation of the air compressor are printed on a sign over the compressor.

Operations and maintenance schedule

Well House	
Daily	Check Overall Function
	Check Sound of Motors
	Check System Pressure
	Read Source Meter
	Check Hydropneumatic Tanks (charge with air as necessary)
If Treatment:	Treatment Equipment Inspection
	Treatment Chemical Monitoring as directed by DOH
Weekly	Measure Flow Rate (weekly preferred, no less than monthly)
	Check Pressure at Flow Rate
Yearly	Measure water level in the well

Storage Tank	
Daily	Check Tank Level
	Conduct Site Inspection and Security Check
Quarterly	Inspect Reservoir Appurtenances (vent, hatch, overflow, etc.)
Yearly	Test low water level alarms
Yearly	Reservoir Cleaning

Distribution System	
As needed	Flushing
	Repair Leaks
Quarterly	Flush Dead End Mains
	Read and Inspect Service Meters
	Test Run Emergency Generator(s)
Semi annually	Exercise Valves and Fire Hydrants
	Yearly Flushing
Yearly	Determine Percentage of Unaccounted for Water
	Perform Meter Maintenance

WATER SYSTEM ROUTINE INSPECTION CHECK LIST

1. RED PRESSURE TANK – check sight glass, level should be close to normal operating line marked on the tank.
2. SYSTEM OPERATING PRESSURE – pressure gauge on the side of #5 pump should be between 51 - 59 psi.
3. PUMP ELECTRICAL CONTROLLERS (4) – all in AUTO and RESET buttons in normal position.
4. NO CIRCUIT BREAKERS TRIPPED – open breaker box and visually inspect the breaker switches.
5. FILTER BACK-FLUSH CONTROLLERS (2) – status lights should be blue or green.
6. TEST THE WELL PUMP FAILURE ALARM – turn ON test switch on south wall near southwest corner - visually check red lights (2) on the outside of the south wall – turn OFF test switch.
7. FLOOR CLEAN AND DRY – there should be no equipment or piping leaks but there may be some condensation on the filters & tanks in hot weather.
8. MAKE A NOTE OF THE DATE & CONDITIONS ON THE STATUS BOARD – call King Water Co. @ 678-5336 in event of problems or questions.

This inspection is performed weekly by the chairman of the Water System Operations.

WATER SYSTEM – MANAGEMENT

The West Beach Road Association is registered with the Secretary of State of Washington as a tax-exempt Home Owners Association. The Bylaws of the association (Article II, Sections 1. and 2.) establish the "orderly means of operating and maintaining the water system" as one of the purposes of the association and provide that all of the facilities and parts of the water system "to be owned by the West Beach Road Association for the use and benefit of its members."

Article IV, Section 1. of the Bylaws states that "the business and affairs of the association shall be managed by the Board of Directors." Article V, Section 5. provides that the elected President of the Board of Directors "shall be the principal executive officer of the association," and Section 10. provides the authority of the President to appoint chairpersons "to assume responsibility for specific functions." On June 30, 2014, the President of the association appointed James M. Patton, a member of the association, as the Chairperson for Water System Operations.

One of the duties of the Chairperson is to supervise water system contractors and vendors. As a Group A Community Water System (as defined by Washington Administrative Code 246-290-020) the association must contract with a State-Certified Water System Operator (WAC 246-292- 032 and246-292-050). A contract of indefinite duration with King Water Company of Coupeville, WA (WA Department of Health Water System Operator No. 013082) was put into effect on August 1, 2003.

Contact telephone numbers:

Chairperson Patton: (360) 678-0983

King Water Company (daytime) (360) 678-5336

King Water Company (night & emergencies) (888) 266-7048

EMERGENCY PROCEDURES

The most likely emergency for our water system is the loss of electrical power to drive the pumps. We have provided a 5.5 kilowatt gasoline generator to provide power for the one-HP distribution pump. NOTE: it is important to connect this generator and provide power to the distribution pump BEFORE the pressure in our system drops below 20 psi to prevent the risk of backflow into the distribution lines from residences and the possible contamination of our system. Instructions for setting up this generator are found on the obverse page.

In the event that power is lost for a period long enough to deplete the water in our reservoir tank below six feet we have provided a 10-HP gasoline powered generator to run the well pump. Instructions for setting up this pump are found inside the main circuit box inside the pump house.

Both of these generators are kept secure in small, locked structures away from the pump house and well head. The keys are kept inside the pump house. NOTE: no gasoline may be stored within 100 feet of the well head.

In the event of power loss, immediately call the Chairman for Water Systems Operations @ (360) 678-0983 and also King Water Company (360) 678-5336 – or (888) 266-7048.

Another serious emergency could be if an Earthquake ruptures the main distribution pipe (6-inch PVC, buried three feet deep) which runs along the north side of Deseret Drive and the west side of Seacliff Lane. If the pipe is ruptured the pressure in the pressure tank and throughout the system will drop as the water leaks out. The distribution pumps will automatically respond to the drop in pressure one after the other until all four pumps are sending water from the reservoir tank to the site of the rupture. The pumps will run until the level in the reservoir tank drops below four feet when they will receive a signal from an electrical probe in the tank shutting them all OFF. When the level in the tank falls below six feet the well pump will respond to another probe in the tank and turn ON to refill the tank.

A really large rupture in the distribution pipe will let water escape at a rate beyond the capacity of the well pump to refill the tank. It is imperative that, in the event of even a suspected rupture in the distribution pipe, the main distribution STOP valve in the pump house be shut OFF. The valve is located low on the interior of the east wall of the pump house next to the fire pump. By shutting this valve, the pressure in the pressure tank will be quickly restored by the one-HP pump and no water will be lost from the reservoir tank. Pressure can be restored in the main distribution pipe after the rupture has been repaired.

Since 2020 another shutoff valve has been installed at the west end of Deseret that can be used to isolate Seacliff Lane in the event that a rupture occurs somewhere along Seacliff and the bluff.

Anyone recognizing that there is a rupture in the main distribution pipe (or even in one of the one-inch pipes connecting a residence) should immediately call the Chairman for Water System Operations at (360) 678-0983 and also King Water Company at (360) 678-5336 or (888) 266-7048.

Another isolation valve is located near the corner of Deseret and Seacliff for the purpose of protecting the distribution along Deseret if a rupture is confined to the line along Seacliff.

POWER OUT--PROCEDURES

1. Turn off all: pump switches- #I, 2, 3, 4, (South Wall) and turn off circuit breaker .# .10. in. breaker-.:box for pump #5

2. Remove the cable plug from the wall receptacle on the South wall (pump-: #5). and. extend the cable through the. pump house door to the generator. The key to the generator shed is above the circuit generator box.

3. Remove generator.from the shed and plug in the.cable to the appropriate generator receptacle. Turn on gas valve for generator and turn switch to run (l) t.hen place choke lever on. Start. generator and~open .choke when running~smooth. Run. generator outside if not raining hard. Align exhaust with vent opening if running inside and leave the door open (use hook on side of pump house). Try to avoid excessive heat in the generator shed (fire..risk).

4. The distribution:.water line is now pressurized to provide water on a limited basis. The reservoir is now the only source of water so conservation is required.

5. The generator maybe left .on and the pressure tank will be refilled when the pressure drops, to about 40 lbs. The generator-may :be turned off when .the . pressure reaches about 60 lbs. and the pressure tank is up to operating level. This will save fuel but requires restarting in order to refill the pressure tank and bring the pressure back to 60-.lbs. Avoid extremely low.water levels in the pressure tank which may cause air in the distribution line.

6. When power.is.restored: Turn generator off and secure in shed after turning off gas supply valve. Return cable to pump house and plug into the receptacle before switching on circuit breaker #1.0 in-the breaker box.

7. When pump #5 has restored the water level, in: the pressure tank to operating level (about 60lbs, pressure) then turn-.on the other pump switches to-the automatic setting (one at a time) from right to left. CAUTION - make.sure, the pressure tank is full or nearly full before

turning on the other pump .switches. If the pressure tank.is.not up to operating level, .the resulting high flow-of water will cause-the tank.to rock or sway (not a good thing)

Note: The door to the pump house may be secured with the bungee cord (above breaker box) to prevent excess rainwater in the building.

Another serious emergency could be the rupture of the main distribution pipe (6-inch PVC, buried three feet deep) which runs along the north side of Deseret Drive and the west side of Seacliff Lane. If the pipe is ruptured the pressure in the pressure tank and throughout the system will drop as the water leaks out. The distribution pumps will automatically respond to the drop in pressure one after the other until all four pumps are sending water from the reservoir tank to the site of the rupture. The pumps will run until the level in the reservoir tank drops below four feet when they will receive a signal from an electrical probe in the tank shutting them all OFF. When the level in the tank falls below six feet the well pump will respond to another probe in the tank and turn ON to refill the tank.

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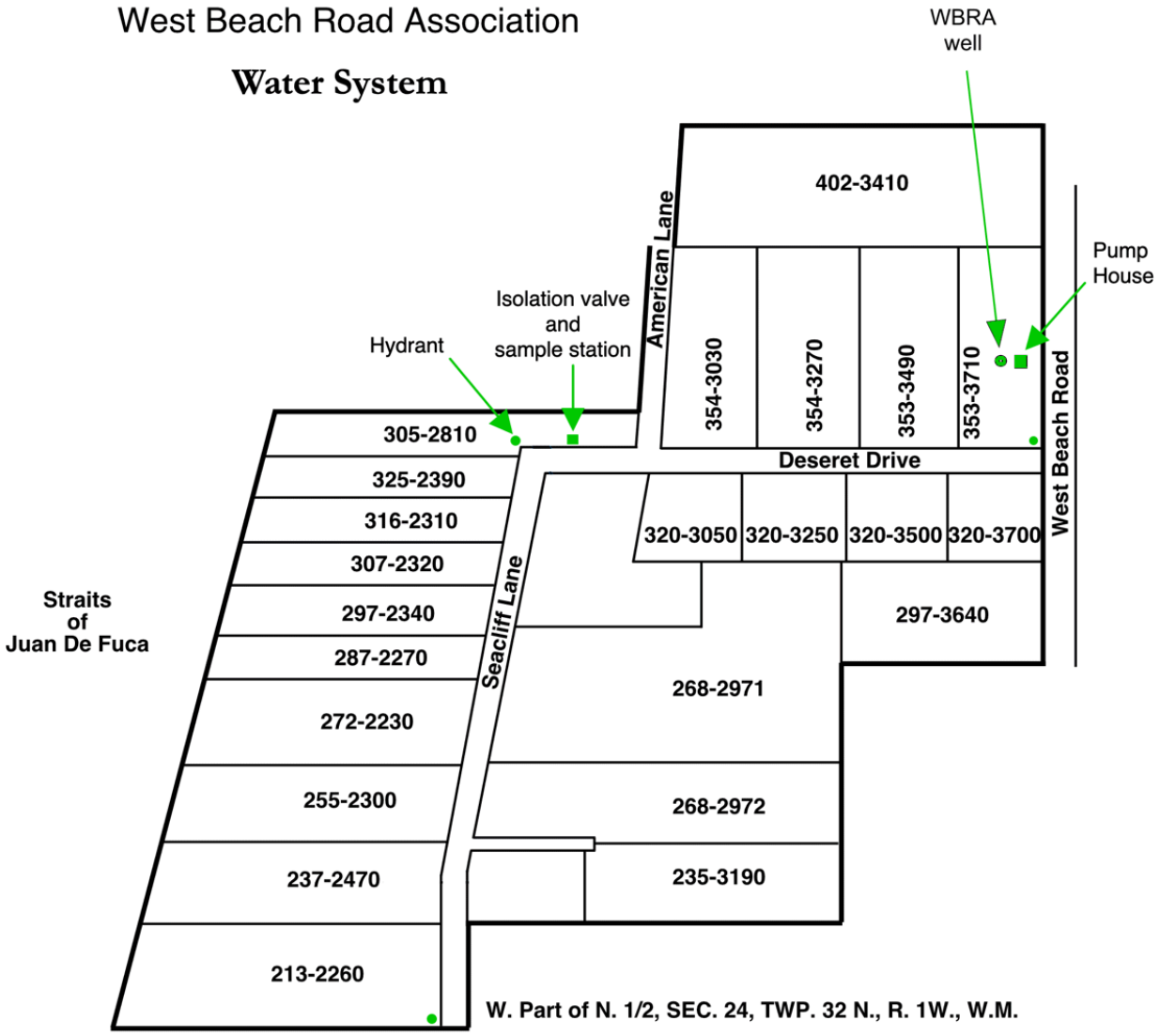
Anyone recognizing that there is a rupture in the main distribution pipe (or even in one of the one-inch pipes connecting a residence) should immediately call the Chairman for Water System Operations at (360) 678-0983 and also King Water Company at (360) 678-5336 or (888) 266-7048.



Water System Map

WATER SYSTEM – FINANCES

Article XII, Section 1. of the association's Bylaws provides that: "For the purpose of maintaining the association's water system and for the supplying of water to each tract, it is hereby declared that all of the tracts, regardless of size or number of acres, may be annually charged such dues and assessments as shall be deemed necessary by the members of the West Beach Road Association."

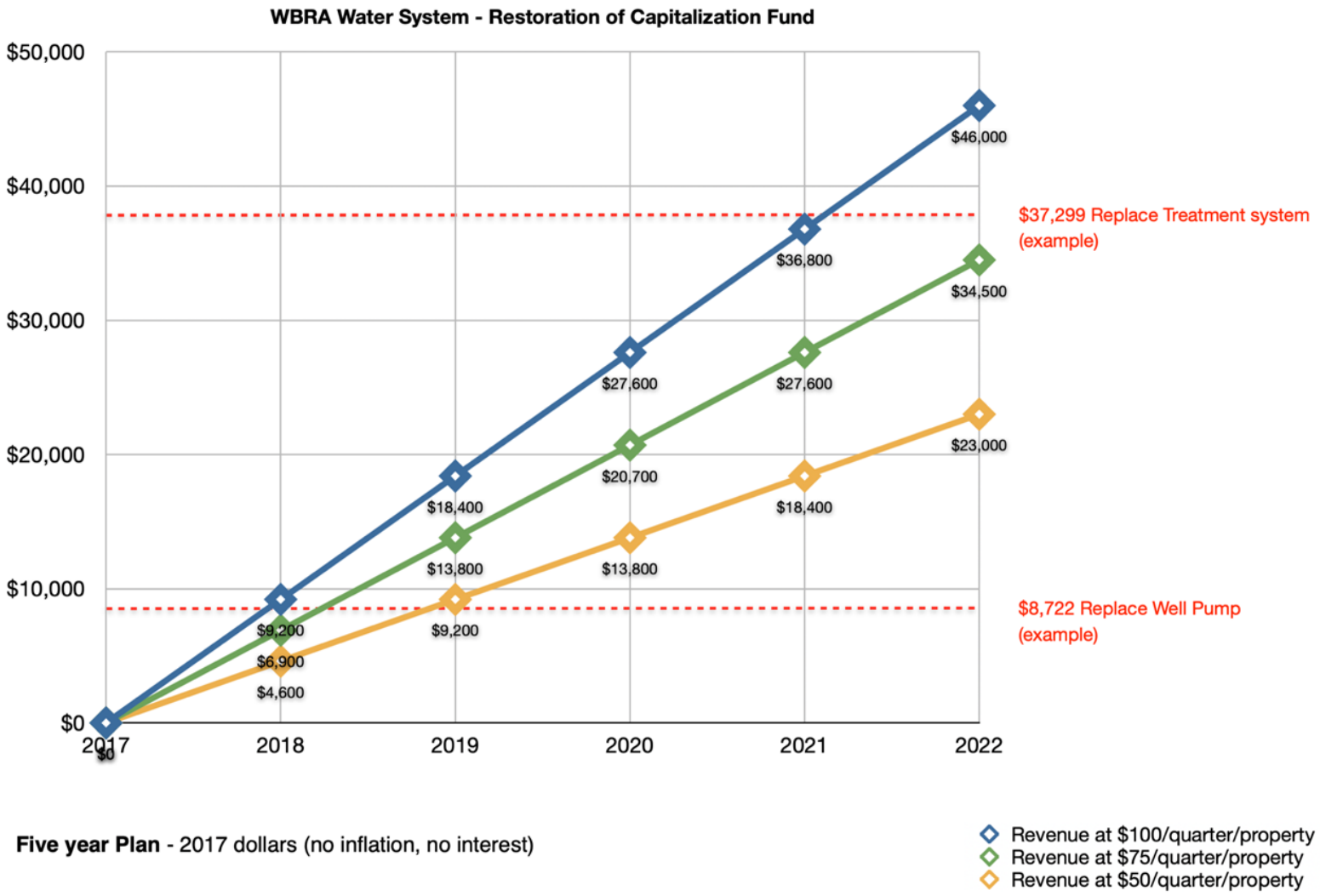
Article XII, Section 2. of the Bylaws provides that: "No member shall tap into the water system maintained by the association without the prior approval of the Board of Directors of the association and said installation must be made in accordance with the terms and conditions established by the Board." These terms and conditions are included in the body of the Water Service Agreement which must be signed by every member of the association.

Article XII, Section 1. of the Bylaws provides that: "The annual dues and assessments shall be imposed by the affirmative vote of the majority of the members of the association each year … and the rate thereof shall be recommended by the Board of Directors." One of the duties of the Chairperson for Water System Operations, appointed by the President of the Board of Directors, is to "Analyze the basis for monthly water fees and make appropriate recommendations to the Board of Directors." An example of the most recent analysis (December 2014 for subsequent years) is on the obverse page.

The members of the West Beach Road Association are charged quarterly by the gallon for the water that they draw from the association's water system. The fee per gallon is reviewed annually and agreed to by a majority of the members. The fee must be sufficient to cover all of the operating costs of the water system. In addition, the members are assessed quarterly for an amount agreed to by the members for recapitalization of all of the components of the water system. The accumulated funds in the Recapitalization Account is kept in the Key Bank of Washington separately from the funds paid into the Operating Account. These accounts are managed by the elected Treasurer of the association and reported regularly to the Board of Directors.

Occasionally, funds are required for maintaining the water system that exceed those in the Recapitalization Account. After carefully analyzing the need for such an expense, the Board of Directors places options for a Special Assessment before the members at a special meeting for that purpose. An example of a recent analysis for the purchase of a new treatment system is on the next page and a list of recapitalization and special assessment expenses since 2011 is on the succeeding page.

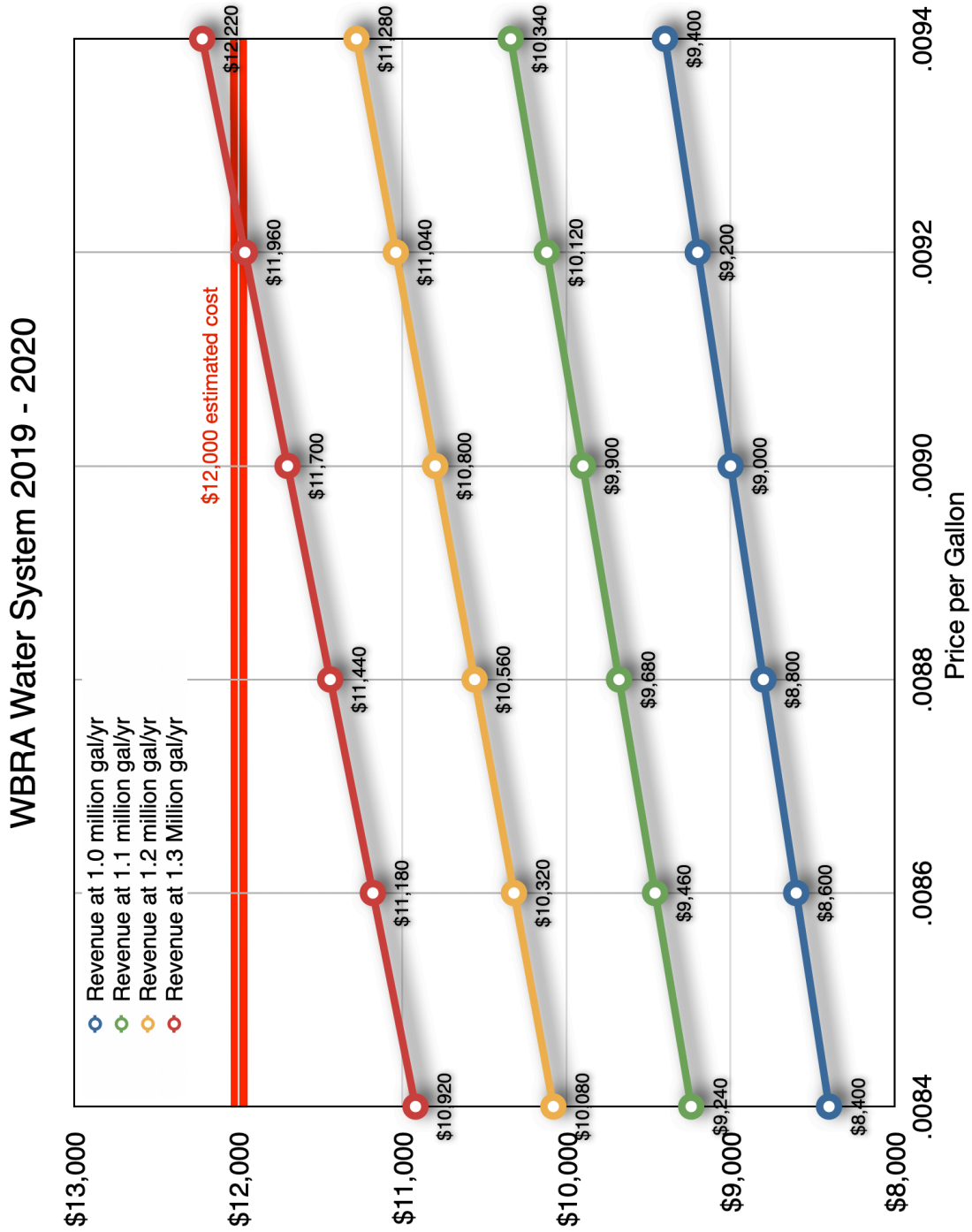
Item	Year	Cost	Financing Method
REPLACED AIR COMPRESSOR	2011	$172.84	WATER RECAP. ACCT.
EXTERIOR PLUG ON PUMP HOUSE FOR EMERGENCY GENERATOR	2013	$700.68	WATER RECAP. ACCT.
SEALED RESERVOIR TANK ROOF	2014	$4,560.00	WATER RECAP. ACCT.
REPLACED SHINGLES ON PUMP HOUSE ROOF	2015	$800.00	WATER RECAP. ACCT.
INSTALLED POTASSIUM PERMANGANATE TREATMENT SYSTEM	2015	$37,299.65	SPECIAL ASSESSMENT.
REPLACED WATER PIPE BETWEEN WELL HEAD AND PUMP HOUSE	2016	$1,421.97	WATER RECAP. ACCT.
REPLACED WELL PUMP & CAPACITORS, + DOWNPIPE & CABLE, ADDED SOUND TUBE	2016	$8,722.28	"BORROWED" FROM WBRA GENERAL FUND
INSTALLED WATER SAMPLE TAP AND ISOLATION VALVE	2020	$6,677.66	WATER RECAP. ACCT.


WBRA Water System - Restoration of Capitalization Fund
$50,000
$40,000
$30,000
$20,000
$10,000
$0
2017
2018
2019
2020
2021
2022
$46,000
$36,800
$27,600
$18,400
$9,200
$0
$34,500
$27,600
$20,700
$13,800
$6,900
$23,000
$18,400
$13,800
$9,200
$4,600
$37,299 Replace Treatment system (example)
$8,722 Replace Well Pump (example)
Five year Plan - 2017 dollars (no inflation, no interest)
Revenue at $100/quarter/property
Revenue at $75/quarter/property
Revenue at $50/quarter/property

RECAPITALIZATION EXPENSE

For further financial information, see the WBRA Treasurer.

Graph used to estimate charges to be used for 2020 to cover the operating costs other than capital expenditures.



Pump-house - additional items

Above and to the left of the Main Breaker box – explaining that the battery for the 10kW emergency generator is under “maintenance” charge in the wellhead enclosure, plus the location of the generator, fuel, keys. etc.

The red “T-handle” tool -- that is used for opening & shutting the valves at the individual water meters

The large grey “T-handle” tool – that is used for opening and shutting the valves that are buried three feet underground. Next to it, a list of those valves at fire hydrants, isolation, etc. See also Water System Map.

APPENDICES

Appendices for this document are included in the original document which is normally kept in the pump house. They are not included in this digital version.

Appendices include:

Monitoring

Treatment System

Maps and Documents

Correspondance

WAC References