Small Water System Sanitary Survey
California Drinking Water Program

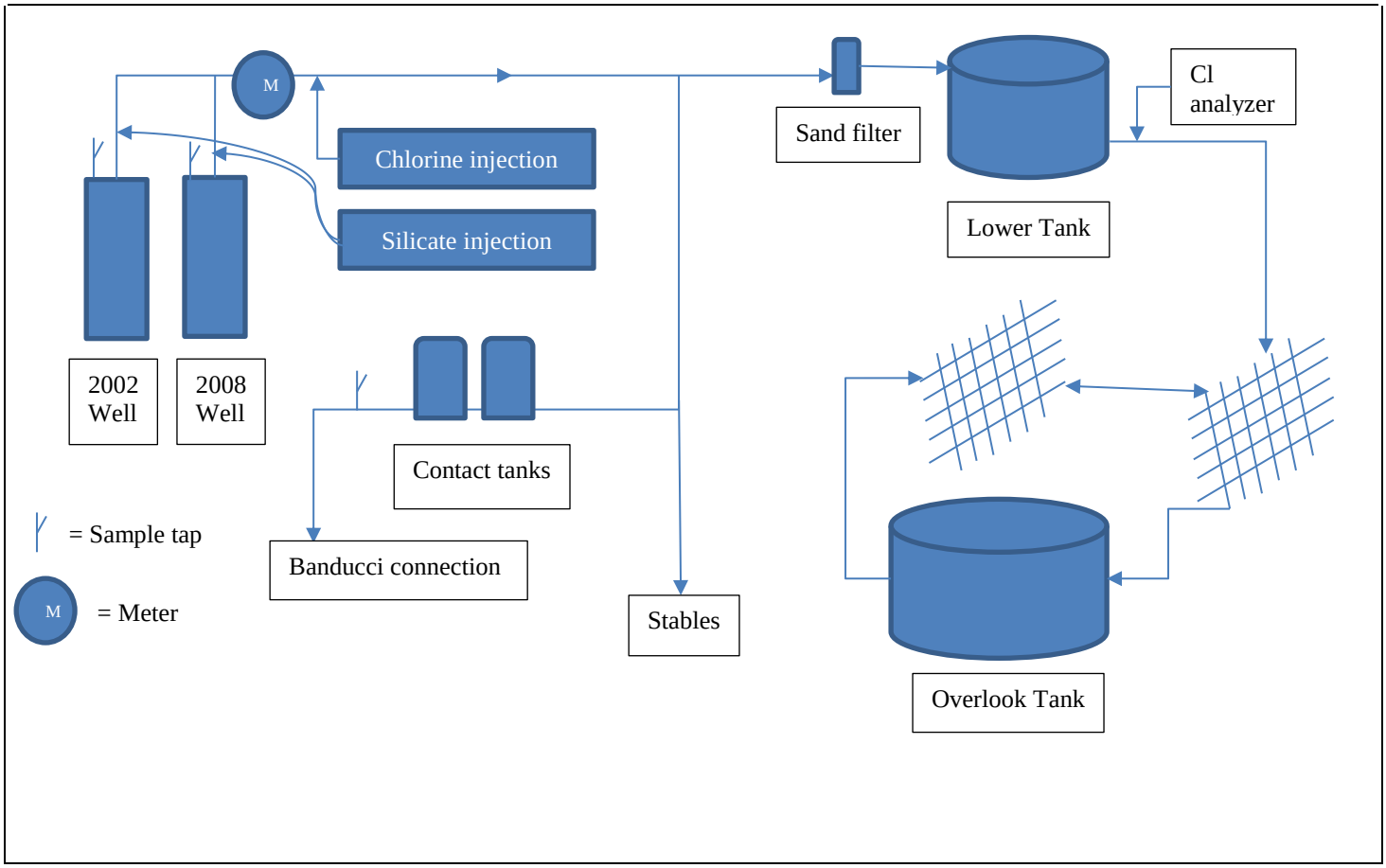
Water System Name: **Muir Beach Community Services District**	Water System No. **2100508**
Inspector: **Misha Anderson**	Title: **WRCE**
Water System Personnel at Inspection: **Mary Halley / Stephanie Blank**	
Position/Title: **District Manager / Operator**	
Water System Owner: **Muir Beach Community Services District**	
Address: **19 Seacape Drive, Muir Beach, CA 94965**	
Inspection Date: **November 7, 2017**	System Classification: **C**

SUMMARY

Brief Description of System

Muir Beach Community (System) is located approximately 3.5 miles southwest to Mill Valley, between Highway 1 and Pacific Ocean. The System serves approximately 350 people and has 160 service connections, including 4 horse stables and 1 restaurant. All connections are metered. The Systems facilities consist of two wells, sodium silicate and 4-log virus inactivation using sodium hypochlorite, two storage tanks and a distribution system with two pressure zones.

Water System Schematic



Photos can be found at:

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System Deficiencies and Areas of Concern:

1. Recommendation: Install generator hook ups at the well sites and Lower Tank booster pump.
2. Recommendation: Professional inspection, and if necessary cleaning, of the tanks every 5 years.
3. Repair opening in screening on Lower Tank (Completed)
4. Fill gap between casing and well cap on both wells (Completed)

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SANITARY SURVEY REPORT

Changes since last inspection:

State Water Resources Control Board – Division of Drinking Water (Division) staff conducted the previous sanitary survey on March 11, 2014. Since then, there have been personnel changes for the District Manager and Operator positions and the Upper Tank (located next to the Overlook Tank) was removed. The system has installed 4-log virus inactivation treatment and added the Banducci connection in 2017, which is not part of the main distribution system.

Permit Status:

The System's permit was renewed on May 31, 2011 due to adding the new 200,000-gallon tank and bringing the System into inventory from Marin County. An amended permit for the addition of 4 log virus inactivation treatment will be issued with this report.

System Source(s):

Two sources: **2002 Well** (CTGA) and **2008 Well** (CTGA). The wells are located across Redwood Creek from the treatment plant, and are approximately 40 feet apart. The entrance is secured by an automatic gate and each well site is secured by a locked wooden fence. The well site is surrounded by the Mount Tamalpais State Park and the GGNRA.

2002 Well: Based on the well log on file the 2002 Well was drilled to the depth of 60' and perforations are located at 32' to 57' deep. This well is the main well and triggered automatically from 9:30 PM till 8:30 AM. The surface features meet the applicable Waterworks Standard. The well is located within 100-year flooding zone.

2008 Well: Based on the well log on file the 2008 Well was drilled in 2008 to service several times per year. The surface features meet the applicable Waterworks Standard. The well is located within 100-year flooding zone.

Field bacteriological result for both wells were <1 Total Coliform and *E.Coli*

SOURCE CODE	SOURCE NAME	STATUS	Annular Seal Depth, ft	CAPACITY (gallons per minute)
2100508-003	2002 Well	A	28' (2' cement & 26' bentonite)	80 gpm
2100508-004	2008 Well	A	25' (8' cement & 17' bentonite)	35 gpm

TOTAL ACTIVE SOURCE CAPACITY

The setup of the wells prohibits both wells running simultaneously. A master meter located at the treatment plant. Based on the available production data, the Maximum Day Demand (MDD) is estimated to be 61,681 gallons per day (equivalent to 42.8 gpm). The 2002 Well can sustain the MDD requirement. The System has a valid water right which limits the diversion of 0.07 cubic feet per second on a 30-day average (equals to 1,357,171 gallons per month). Due to lack of 50' annular seal and proximity to the creek, the System conducts monthly raw water bacteriological sampling. In early 2016, the 2002 Well had *E.Coli* detections, The 2008 Well was used while investigating the detections, Holes were found in the casing of the 2002 Well and repaired. Based on the consistent Total Coliform detections and occasional E. Coli detections the System was required to install 4 log virus inactivation. The well logs show a clay layer which may act as an additional barrier from the surface water. There appears to be no GWUDI concern.

Treatment:

The System's treatment consists of sodium silicate for corrosion control and sodium hypochlorite as precautionary disinfection. The sodium silicate is injected at the wells and is triggered on by the well pump, this allows for 15 seconds of contact before the water gets to the plant. The chemical is PQ Corporation N40 37.5% sodium silicate (NSF 60 certified). The undiluted chemical is stored in a blue 55-gallon plastic crock. The System uses about one crock per month at gets delivery of the chemical every 6 months. Chemical level in the crock is detected by a digital sensor. The chemical pump is a LMI 0.21 gallon per hour (gph) pump. The residual is monitored every 3-5 days and the concentration is maintained at

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16 to 24 per per million (ppm) with minimum of 13 ppm. The silica residual is monitored quarterly at the farthest location in the distribution (160 Pacific Way).

Sodium hypochlorite is injected at the combined pipe at the treatment plant. The chemical is HASA Sani-clor 12.5% sodium hypochlorite (NSF 60 certified). The undiluted chemical is stored in a graduated 5-gallon drum. The chemical pump is LMI 1.6 gph pump and is triggered on by the well pump. Backup pumps are available at the maintenance trailer (next to the treatment plant). The chlorine dosage is measured daily at the 5-gallon drum and residual is measured every 20 minutes at the Lower Tank by a Hanna PCA-320+AKCP and monthly at 160 Pacific Way when the routine bacteriological samples is collected. The chlorine analyzer's alarm low set point is 0.4 milligrams per Liter (mg/L), at the time of the inspection the residual was .051 mg/L, the pH was 7.86 and temperature reading was 57.7° F. Though not required till the amended permit is issued, the system has been submitting CT compliance summaries since October 2017, the residual range at the Lower Tank in the April 2018 summary was 0.37 to 0.54 mg/L. The System achieves 4 log virus inactivation contact time for the main water system with the in the transmission pipe (ductile iron, 5,500 ft with 4.15" inner diameter) and clearwell (Lower Tank, 5,287 gallons/foot, lowest level: 10 feet). For the main distribution system, the chlorine residual is measured at the outlet of the Lower Tank before the first connection. One connection (Banducci) is not served by the main distribution system. This connection splits off after the treatment plant and achieves 4-log virus inactivation with contact time in two 80-gallon contact tanks. The chlorine residual for this connection is measured after the contact tanks, the target dose is 0.8 mg/L. The NSF 61 certified contact tanks are made by Flexcon Industries (MixMaster) and have a 0.8 baffling factor. The 4- log virus inactivation monitoring and operations plan (approved on 5/18/2018) describes how the 4-log virus inactivation is achieved, in addition to describing the operations and monitoring of the treatment.

Field chlorine residual was 0.50 mg/L at the Lower Tank and 0.23 mg/L at Overlook Tank.

The System has a Purex Triton Tagules sand filter located prior to the Lower Tank to remove sediments. The filter is backwashed 1 to 2 times per month.

Finished Water Storage:

The system has a total storage capacity is 300,000 gallons, which exceeds the MDD requirement (61,681 gallons per day)

Lower Tank is a 100,000-gallon redwood tank located almost to the end of Starbuck Drive. The tank was installed in 1988 and is in good condition. The screen is intact, the ladder is secured, and the hatch is locked. An air pump in a cooler on the roof aerates tank for taste and odor and help circulation, the aeriation operates 24/7 cycling on every other hour. The tank was cleaned about 5 years ago, the System plans schedule a tank cleaning soon. The inlet and two outlets are located at the side bottom. Overflow and drain pipes converge underground and drain downhill. The end of the overflow/drain pipe was not screened. Then the water either gravity-feeds to distribution system or is boosted by a transfer pump (located in an underground vault) to upper distribution zone and the Overlook Tank.

Overlook Tank (200,000-gallon concrete tank) are located at west end, at Muir Beach Overlook and Seascape Drive. The Overlook Tank was installed in 2010 and is in good condition. At the time of the inspection the vent screen was intact, the ladder was secured, and the hatch was locked. Per Mr. Hills, aeration device at each tank is operated several hours at night and both tanks are visually inspection every 2 to 3 days. The Overlook Tank hasn't been cleaned since it was installed. The Overlook Tank has a low-level alarm which is triggered when the water level drops to 14'. Due to the high capacity compared to the demand the operators boost the chlorine levels at the Overlook tank weekly with 4-6 cups of sodium hypychloite. The System plans to install a chlorine analyzer at the Overlook Tank. The chlorine residual measured during the inspection was 0.23 mg/L. The Division recommends the tanks be professionally inspected, and if needed cleaned, every 5 years.

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Distribution System:

The System has two pressure zones which are connected at two pressure reducing valves. A distribution schematic is on file with the Division and includes the piping size and materials are: 6" asbestos cement, 4" and PVC, 6" PVC and 6" and 2" HDPE pipes. The lengths are unknown. The System flushes 1 to 2 times per year, exercises the main valves about twice per year, and water mains are disinfected in accordance with AWWA. Cross-connection survey was conducted in March 2012 and no cross-connection was identified. The District Manager or board members receive complaints, and keep a compliant log at the treatment plant. Distribution samples were collected at the Lower Tank and Overlook Tank during the inspection, both samples were absent for total coliform and *E. Coli*.

Pumps, Pump Facilities, and Controls

The whole distribution elevation is ranged from 20 feet to 480 feet above mean sea level. The System has a booster pump located in an underground vault at the Lower Tank site (elevation ~260'). The pump is a 10-hp, 60 gpm, and discharging pressure is approximate 100 psi.. The System has no means of providing emergency power at the well site or booster pump station, but the monitoring station at the Lower Tank site has emergency power supplied by 12V direct-current batteries. The Division recommend the System investigate installing generator hook ups at the well sites and Lower Tank booster pump to enhance water system resiliency during emergency events.

Operator Certification:

The System is classified as a T1 and D1 system and Stephanie Blank meets the System's requirements.

Stephanie Blank, System Operator **Certification Grade/Number**	**Expiration**
T2/36342	7/1/2020
D1/54609	6/1/2021

Water Quality Monitoring and MCL Compliance: **Source Chemical Monitoring:**

The System is up to date on all source chemical monitoring. The 2002 Well manganese results exceed the secondary MCL and the 2008 Well has had iron, manganese, and turbidity exceed the secondary MCL, the most recent samples have been below the MCL except for manganese. Manganese at both wells are on quarterly monitoring frequency. Iron at the 2008 Well is on quarterly monitoring frequency.

Distribution Monitoring

Distribution asbestos sample were collected in 2006 had results of non-detect. The most recent Bacteriological Sampling Plan/Groundwater Rule plan was approved on June 8, 2017 and is up to date. The System collects one sample per month. Bacteriological samples collected at Lower Tank and Overlook Tank were absent for Total Coliform and *E.Coli*.

The System is on a triennial frequency for 'at the tap' Lead and Copper sampling. The next sample set is due to be collected during summer 2020. The system installed sodium silicate as Corrosion Control Treatment in 2006. For the most recent sample set consumer notification of lead sample results was conducted by mail and email. EPA recommend lead sample results be posted online.

The System's Disinfection Byproduct (DBP) Plan was approved on May 1, 2013, the plan is up to day. The System is on reduced Triennial sampling frequency. The next DBP samples must be collected during October 2018.

Other Monitoring:

The System collects raw bacteriological samples monthly from both wells. Raw bacteriological sample results for the past 12 months had 13 samples with Total Coliform present and one sample with *E. Coli* present. The System monitors the chlorine residual, pH, temperature and tank level at the Lower Tank and chlorine residual after the contact tanks serving the Banducci connection daily to complete the CT compliance summary. The system must submit this summary monthly, by the 10th of the following month. To comply with a condition of the 2011 permit the system submits a monthly summary of the sodium silicate levels and operations notes

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System Management and Operation:

The District Manager, hired by the Board, manages the System. The current District Manager who handles the water system duties is Mary Halley. Mary has been in the position since early 2017. A previous district manager who served in that role for many years is the board vice president. The most recent Emergency Notification Plan was approved on April 30, 2018. The Consumer Confidence Report, water rates, annual budgets, and financial reports are available at Muir Beach CSD website. In 2017, the longtime operator retired and the operator of the neighboring Green Gulch Farm took over the duties. Muir Beach Community has all plans up to date, all CCR and Annual Reports submitted for the last 5 years and certified operators. The System has not been issued any MCL violation or monitoring and reporting violations and no significant deficiencies were identified during the inspection. These factors qualify the System as having an outstanding performance record.

Database updates:

☒ Contacts up to date? ☒ Treatment up to date ☒ Sources up to Date ☒ Inspection entered ☐ Permit entered or NA

For Community Systems: Does the System have an Outstanding Performance Record? ☒ Yes ☐ No ☐ Unk ☐ N/A

Must be able to answer yes to all below over the last five years:

☒ No MCL violations? ☒ Submitted CCRs for past 5 years ☒ Operation Plan is good, OR Op Plan not required

☒ No M&R violations? ☒ Submitted Annual Reports for past 5 years ☒ All Plans up to Date

☒ Certified Operator? ☒ No Significant Deficiencies identified?

Process 1) Indicate in the inspection report. 2) Note in the letter. 3) Log into OPR System spreadsheet in Paradox.

OPR SYSTEMS

Revised 2014