A Guide for Private Domestic Well Owners

June 2025

Compiled by:

The California State Water Resources Control Board

Groundwater Ambient Monitoring and Assessment (GAMA) Program

Contents

Limitations

This document is provided for informational purposes only. Water quality problems in private domestic wells may occur even when precautions are taken. This guide can help well owners with water quality testing and interpretation and contains tips to help preserve and maintain your well.

For additional questions, please contact your local environmental health agency, or contact The State Water Resources Control Board (State Water Board) Division of Water Quality by email at GAMA@waterboards.ca.gov.

ACRONYMS and ABBREVIATIONS

DTSC = Department of Toxic Substances Control

DWR = Department of Water Resources

EC = electrical conductivity

MCL = maximum contaminant level

mg/l = milligrams per liter

State Water Board = State Water Resources Control Board

TDS = total dissolved solids

µg/l = micrograms per liter. (A microgram is 1/1,000th of a milligram, and 1/1,000,000th of a gram.)

US EPA = United States Environmental Protection Agency

VOCs = volatile organic compounds

Introduction

The water used in California for everyday life, irrigation, and industrial purposes is often a mixture of surface water and groundwater. Surface water can be readily seen in natural lakes, rivers, and stored in man-made water infrastructure such as behind dams and levees. Groundwater cannot be seen and is stored in aquifers below land surface.

Californians are heavily dependent on groundwater to meet their water needs. In an average non-drought year, groundwater comprises about 40% of water used, while surface water makes up the remainder. During a drought year, groundwater use may increase to up to 60% of water used. Groundwater reliance varies based on drought and location.

Surface water use is regulated using a system of water rights. However, groundwater use has historically been unregulated and only in recent years has there been regulation through laws established by the Sustainable Groundwater Management Act (Statutes of 2014) in the California Water Code, section 10720-10738. Groundwater quality has historically been regulated for the purpose of municipal public water supply but is limited for private and smaller water systems.

Well ownership can be daunting when an owner wants or needs to perform well or pump maintenance, test the water quality, filter their water, determine the water level in their well, or any other tasks that go along with owning a well. This Domestic Well Owner's Guide was developed to assist well owners in managing their wells and answering related questions.

Groundwater Basics

What is Groundwater?

Water that has infiltrated into the ground effectively becomes groundwater. However, not all groundwater is usable. For groundwater to be utilized, water must fill the pore spaces or fractures within the soil and rocks, creating a saturated zone. The top of the saturated zone is called the water table. When a water well is drilled, the driller must ensure the well is deep enough to extend below the water table to allow a constant flow of water into the well.

The saturated zone is called an aquifer. Aquifers are described as unconfined, where water infiltrates through the land surface directly to the aquifer, or as confined, where an impermeable layer of clay or other materials (known as a confining bed) separate the saturated aquifer from the land surface or other aquifers (Figure 1).

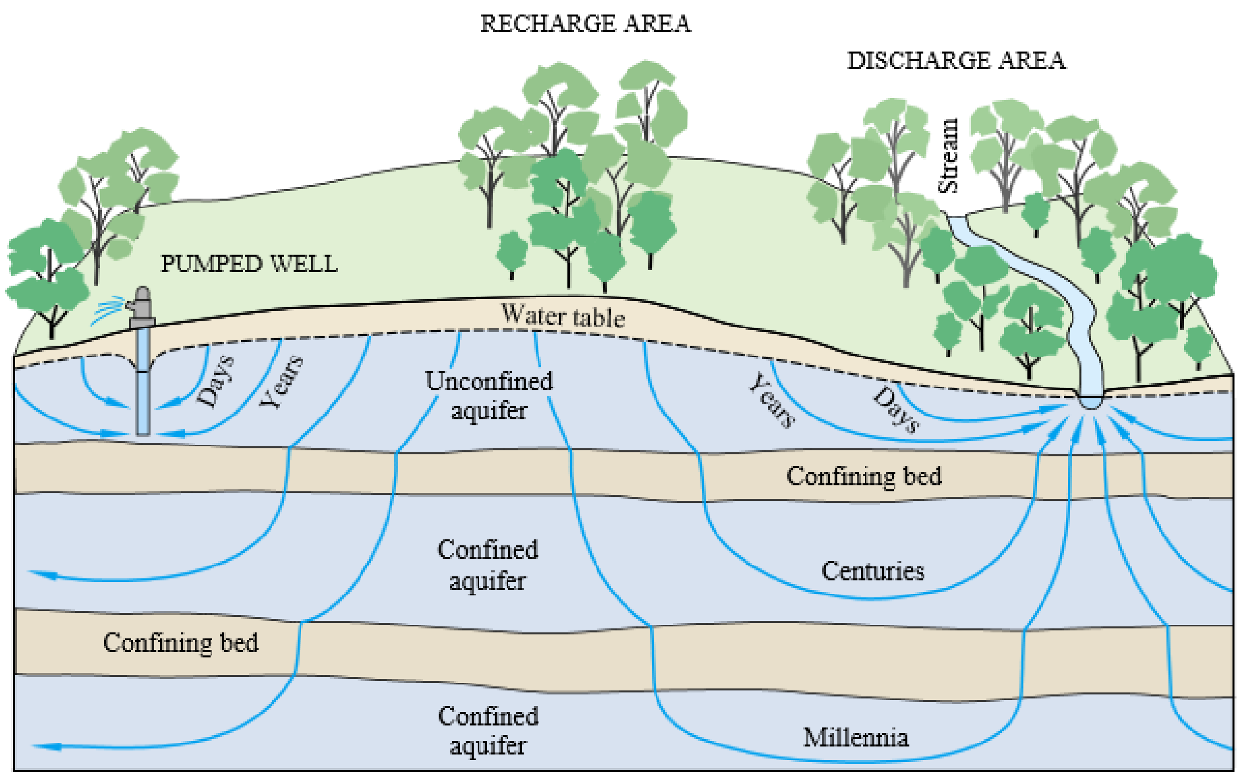


Figure 1: A typical, though simplified, groundwater system showing the different aquifer types and confining layers. Also shown are the average times for recharge to occur in the different aquifers.

Who Uses Groundwater?

Typically, groundwater is used for drinking water, irrigation, and/or industrial activities.

Drinking water use can be divided into public and private, or regulated and unregulated. Households outside of urban areas typically rely on groundwater for all their needs, while households in urban areas are provided a mixture of groundwater and surface water from a water agency.

Agricultural uses for groundwater consist of crop irrigation and livestock watering. Typically, farms will rely on surface water and supplement groundwater when necessary. During drought conditions, the percentage of groundwater used for irrigation can increase dramatically.

Industrial uses of groundwater are typically not intended for human consumption. In some cases, groundwater quality needs to meet certain criteria for use, such as when used for industrial cooling purposes.

How is Groundwater Accessed?

Groundwater is typically accessed through wells that extend into an aquifer but can also flow freely at or near the surface in what is known as a spring. In either case, the groundwater is carried through pipes leading to pressure tanks, storage tanks, filtration, or any other system the well owner has developed. This system eventually leads to a faucet where water can be collected and utilized for the intended purpose, such as a kitchen for drinking water or a hose for irrigation.

A groundwater well is usually constructed of a steel or plastic well casing large enough to contain a pump and deep enough to reach the aquifer. Sections of the well casing are typically perforated to allow water to flow into the well. The water within the well is then pumped to the surface. (See section “Well Construction” for more information.)

The diameter of the casing, the size of the pump, and the yield of the aquifer determine how much water may be pumped (Table 1). This is information typically determined prior to well construction.

Table 1: Common well types and their associated average depths, well diameters, and pump rates. These are rough averages only and true scenarios will vary depending on the geology.

Well Type	Well Purpose	Depths (ft)	Well Diameter	Pump Rates
Public Supply Well	Drinking water for 15 or more service connections	100s-1000s	>12 in	1500-3000 GPM (based on Sacramento regional Water Bank)
Domestic Supply Well	Drinking water for one household	100s	4-6 in	6-12 GPM
Irrigation Well	Irrigating fields, not to be used for drinking water	100s-1000s	6-18 in	20-40 GPM (small) 700-1500 GPM (large)
Environmental Monitoring Well	Groundwater sampling and water level measurements	10s-100s	2 in	0.5-3 GPM

*Pump rates depend on the size of the pump. Rates are averages for the well type.

Domestic wells are intended for a single household, so they tend to have smaller casing diameters and are predominantly shallowly drilled. Public supply wells have a high demand, so they have wider casing diameters and are drilled deeper. Irrigation wells are a moderate well type, with a casing diameter and depth greater than domestic wells but usually not exceeding public supply wells. Environmental monitoring wells are used to collect information on groundwater and therefore do not have a high water demand, allowing them to have a smaller casing diameter and variable depths compared to domestic wells.

What Happens when Groundwater Levels Decrease?

When groundwater is pumped, it creates a cone of depression in the immediate vicinity of the well. When pumping stops, the water level typically returns to the pre-pumping level. Excessive pumping may alter the entire aquifer, lowering the water table. During drought conditions, there may not be enough natural recharge occurring for water levels to remain stable and aquifers may begin to lower. Decreasing water levels can cause wells to go dry. Shallow wells will typically be affected first. Dry wells may be fixed by either lowering the pump below water level, deepening the well, or, in some cases, a new well must be drilled.

What is Groundwater Quality?

Groundwater consists of physical, chemical, and biological qualities. Physical qualities typically can be experienced without assistance from instruments and include temperature, turbidity, color, taste, and odor.

Physical qualities may be influenced by chemical qualities. Chemical qualities include the presence of chemicals or constituents that may be natural or man-made, such as the presence of arsenic, chromium, and oil.

Biological qualities are defined by the presence and type of bacteria and other organisms.

Groundwater quality is related to several factors including geology, climate, and land use. Many naturally occurring chemicals in groundwater are derived from dissolving rocks, soil, and decaying plant material, such as arsenic, uranium, potassium, ammonia, and nitrates. Groundwater can become contaminated by natural processes or by human activities. Human activities, such as agriculture and industrial factories, can mobilize naturally occurring substances like salts, minerals, and nitrate.

Some chemical compounds are not naturally occurring in nature, such as pesticides and volatile organic compounds (VOCs). These substances can enter groundwater through spills, irrigation, wastewater percolation fields, leaking underground storage tanks, and other sources. Groundwater quality can also be affected by particulates such as microplastics.

Private Domestic Well Ownership in California

Most Californians (about 95%) obtain drinking water from a public or municipal source. These supplies are typically treated and ensure that the water is safe to drink and complies with water quality standards. Water agencies that provide public water supplies must abide by strict regulations.

Californians in rural areas are more likely to be served by either a private domestic well or by water systems serving fewer than 15 service connections (state small water systems). State small water systems may be regulated on a county level and require well water sampling. Private domestic well owners are responsible for maintaining their wells and are encouraged to test their well’s water quality.

It is recommended that private well owners test their well once a year to ensure their water is safe to consume. Water quality testing kits are available for purchase that detect the presence of certain constituents in water. However, these kits may not provide a numerical concentration.

Prior to collecting a sample from your well for laboratory analysis, it is recommended that you contact a lab. In most cases, the laboratory may provide a water quality sampling kit that you will use to sample your well and return the samples to the lab.

There are many water quality laboratories in California, and across the nation, and costs may vary based on the number of constituents the lab will analyze. We recommend you research water quality analysis laboratories and request quotes before selecting a lab. The State Water Board maintains a list of certified drinking water laboratories that can provide testing in your area, but it is not always necessary to select a laboratory from this list.

If the results of these tests indicate an exceedance of a California drinking water maximum contaminant level (MCL), then it may be recommended that an alternative drinking water source be utilized while investigating ways to fix the problem. We recommend consulting with a water quality professional with any concerns. An MCL is the highest concentration allowed in drinking water for many constituents based on hazardous health effects to exposure, treatment techniques, technological ability, and economic feasibility. An MCL can be defined at the national or state level, however, when a state adopts its own MCL it must be at least as stringent as the federal MCL. An example is nitrate, a common constituent found in groundwater, which has an MCL of 10 mg/L.

Private domestic well owners may be able to reduce constituent concentrations, if necessary, through water treatment. Water treatment systems include:

- Mechanical filtering used to remove particles in water;
- Absorption filtering used to trap waterborne constituents;
- Ion exchange used to soften hard water; and
- Reverse osmosis is used to remove constituents by forcing water through a semi-permeable membrane under pressure.
- × Despite common belief, boiling water does not remove many commonly found toxic constituents.

If the well water is too impacted to effectively clean, private domestic well owners may need to consider drilling a new well.

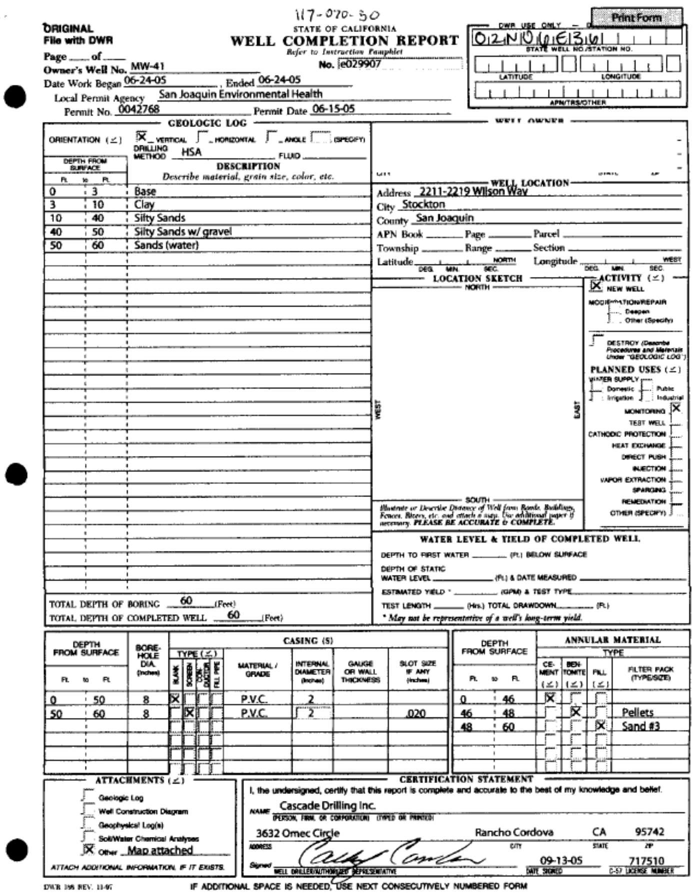
Well Construction

Well drilling contractors must obtain permits from the local regulatory authority, typically the county environmental health department, prior to any work performed on an existing or planned well, such as construction, modification, or destruction. Domestic wells must be drilled by a licensed contractor with a C-57 Well Drilling License and must meet applicable local and/or state well standards. The Department of Water Resources (DWR) has established well construction standards that local agencies typically follow or utilize as a basis for their own requirements (well standards).

When choosing the location for a new well, the area should be free of potential sources of contamination such as septic systems, underground storage tanks, landfills, etc.

While drilling the well, the driller records geologic information, such as depth intervals, for the type of material encountered (Figure 2). This information is recorded in a driller's log or well completion report document that is then submitted to the local permitting agency, DWR, and the private domestic well owner.

The well boring diameter is drilled slightly larger than the well casing to accommodate well materials (casing, filter packs, and seals). The size of the well boring is dependent on the use of the well (Table 1). For example, domestic wells serving one household is typically 4-6 inches in diameter.


ORIGINAL
File with DWR
STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet
Print Form
Page ___ of ___
Owner's Well No. MW-41
No. e029907
Date Work Began 06-24-05 Ended 06-24-05
Local Permit Agency San Joaquin Environmental Health
Permit No. 0042768 Permit Date 06-15-05

GEOLOGIC LOG
ORIENTATION: VERTICAL (X)
DRILLING METHOD HSA

Depth from surface (Ft. to Ft.)		Description
0	3	Base
3	10	Clay
10	40	Silty Sands
40	50	Silty Sands w/ gravel
50	60	Sands (water)

TOTAL DEPTH OF BORING 60 (Feet)
TOTAL DEPTH OF COMPLETED WELL 60 (Feet)

WELL LOCATION
Address 2211-2219 Wilson Way
City Stockton
County San Joaquin

ACTIVITY: NEW WELL (X)
PLANNED USES: MONITORING (X)

WATER LEVEL & YIELD OF COMPLETED WELL

Depth from surface (Ft. to Ft.)		Bore-hole dia. (inches)	Type	Material / Grade	Internal diameter (inches)	Slot size if any (inches)
0	50	8	Blank (X)	P.V.C.	2	
50	60	8	Screen (X)	P.V.C.	2	.020

Depth from surface (Ft. to Ft.)		Annular material type	Filter pack
0	46	Cement (X)	
46	48	Bentonite (X)	Pellets
48	60	Fill (X)	Sand #3

ATTACHMENTS: Other Map attached (X)

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME Cascade Drilling Inc.
3632 Omec Circle Rancho Cordova CA 95742
Signed 09-13-05 717510

Figure 2: Example of a well log. Important to note section describing depths associated with material types.

The boring depth also varies with well use. Domestic wells are typically considered shallow and may tap shallower aquifers in the range of hundreds of feet depth. Public supply wells tap deeper aquifers and can be up to a thousand or more feet deep depending on the depth to water.

The well boring is typically drilled through layers of gravel, sand, silt, and clay. Fully saturated materials that are permeable enough to transmit water are known as aquifers. Impermeable materials that may prevent or slow water from passing through the layer is known as an aquitard or confining layer. Water quality may vary depending on depth and aquifer material. Due to this variability, a well may need to extend beyond first encountered water to reach a depth with higher water quality or water production volumes.

Well casing is installed after the boring is completed (Figure 3). The casing material may be PVC (short for Polyvinyl Chloride), or steel, depending on the use of the well. The casing extends at least one foot above the land surface and near the bottom of the boring. Portions of the casing will have cuts or perforations (well screen) and/or can remain open at the bottom (open hole completion) to allow water in the well. To keep fine sand, silt, and clay from entering the well, the driller may surround the well screen with sand or gravel, known as a filter pack.

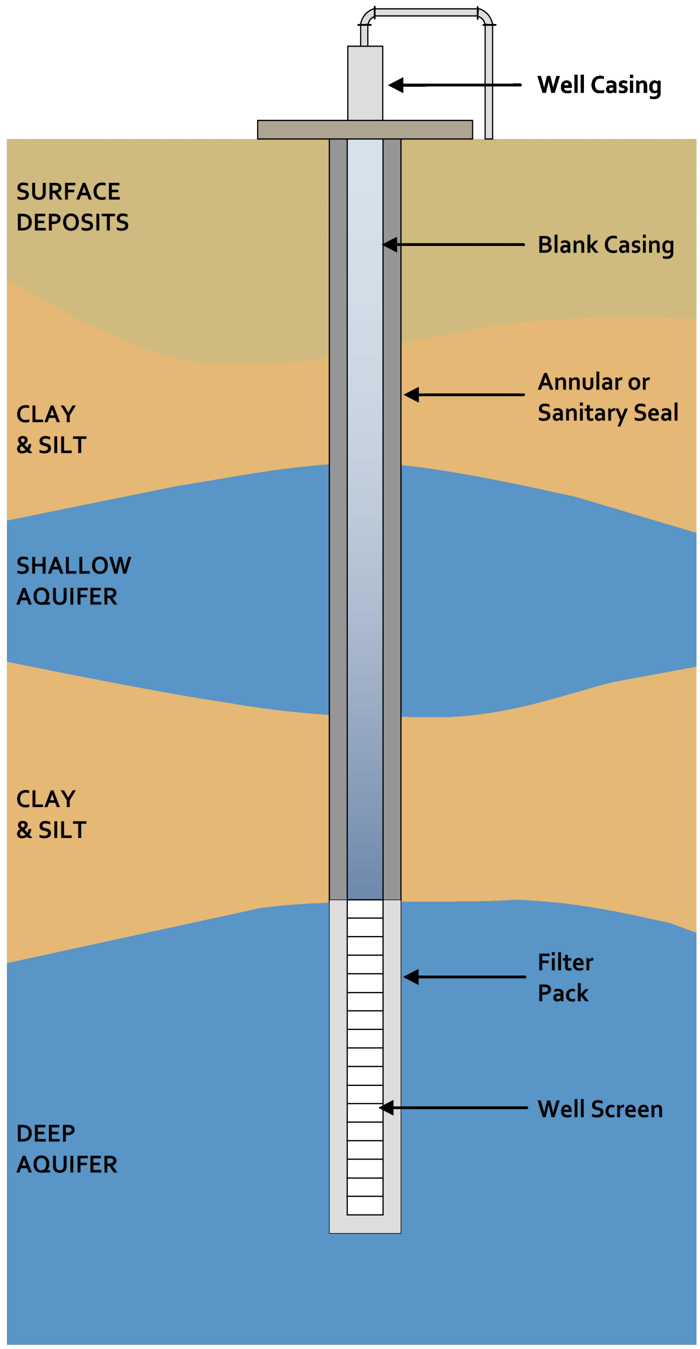


Figure 3: Typical well construction.

The casing is typically encased in cement or bentonite within the boring to prevent water intrusion from depths other than the targeted aquifer. The concrete or cement seal at the top of the casing is known as the annular, or sanitary, seal and is designed to prevent surface contaminants from entering the well. Local well permitting authorities generally mandate well seal depths.

On the land surface, the wellhead should be protected with a concrete pad. The top of the well casing should be securely capped so nothing, including surface water, can enter the well. The cement pad should be designed so that it slopes away from the well head to prevent water pooling near the casing.

A well pump is used to bring water to the surface. The most common pump is a submersible pump placed inside the well casing at a depth beneath the water level and above the bottom. Pump placement within a well is an important factor. A pump set too high will be susceptible to going dry with decreasing water levels. A pump too low could take up sediment that has collected and can damage the pump and associated well components. Sediment may also collect in storage tanks or pressure tanks, requiring additional maintenance.

Well construction details, such as the size of the boring and depth, are dependent on the use of the well (Table 1). Larger diameter deep wells are typically used for high extraction rates that can be used to deliver water to public supply systems or farms. Smaller diameter shallow wells typically provide water to one household. Other types of wells will vary in size. The casing type and pump type will also vary with intentional use. Wells extracting high volumes of water need a stronger pump than a private domestic well.

After a well is constructed, it must be developed. Developing a well consists of pumping water for a set amount of time to remove drilling mud or sediment that collected during construction of the well.

Water Quality Testing

Groundwater quality can change over time as extraction and recharge of the aquifer occurs. Groundwater extraction can concentrate some constituents, thereby increasing concentrations that can exceed MCLs. Recharge of the aquifer may dilute concentrated constituents but can also introduce more or new constituents. Water is considered safe to consume if constituents do not exceed drinking water standards. Changing water conditions can turn safe drinking water into water that may be unfit for consumption. This is why it is important to test regularly.

Testing a Water Well

A private domestic well owner can sample their well water using a well testing kit or employ the services of a water quality testing laboratory. To determine if a constituent is present in well water at concentrations above the safe consumption limit, a water quality testing laboratory must run the analysis.

It is recommended that the private domestic well owner obtain quotes before selecting a laboratory. The State Water Board provides a list of certified laboratories. However, it is not always required to use a certified laboratory.

When sampling a private domestic well the equipment needed will vary depending on what is being sampled for. While collecting a sample it is important to not introduce any contamination from the atmosphere or surface. This is achieved by using clean sterilized bottles and equipment, typically provided from the laboratory. The sample should be taken as close to the well head as possible from a spigot, if available. Many private domestic wells do not have a spigot near the well head and may need to collect samples closer to the household. If the water collected has not passed through a treatment point, then the sample should be representative enough of the groundwater.

What to Test

There are many constituents that may be found in groundwater. At a minimum, it is recommended that private domestic well owners test for total coliform bacteria, nitrate, and electrical conductivity annually. A more extensive list of constituents to sample for will depend on the private domestic well's location and potential problems.

It is recommended to sample for more constituents if they are suspected of being in the groundwater. If well water changes in taste, color, smell, or other appearance, owners should consider sampling their well water for more constituents.

Commonly Encountered Constituents

Drinking water, including bottled water, may contain trace amounts of some chemical constituents and is considered normal. Water can dissolve naturally occurring minerals as it flows over and through materials in the ground. For example, iron, magnesium, and calcium are natural constituents that are beneficial constituents in small amounts.

Commonly analyzed for water constituents include:

- Microbes – Viruses and bacteria can come from sewage, septic systems, animal operations, and wildlife.
- Minerals – including salts, nitrate, and metals can be naturally occurring or can result from human activities at the surface.
    - Metals include iron, manganese, aluminum, arsenic, and lead.
    - Salts include sodium, magnesium, calcium, and potassium.
- Pesticides and herbicides – derived from agricultural land use, urban stormwater runoff, and residential uses can be found in groundwater.
- Organic chemicals – including VOCs, are derived from industry, gasoline stations, agriculture, stormwater runoff, and septic systems have been detected in groundwater.
- Radioactive elements – typically occur naturally, however human activities at the surface can release naturally occurring radioactive elements from sediments and bedrock.

Sampling Costs

Basic sample analysis can range from \$100-\$400. Table 2 provides a range of prices per constituent or suite of constituents. Prices may vary between laboratories' analytical suites.

Table 2: Water quality tests for domestic well owners. These costs are averages and more research should be done before selecting tests.

Test	Recommended Frequency	Cost	Result Thresholds*:	Considerations
Coliform Bacteria	Test for total coliform annually; fecal if total coliforms are detected.	\$30 - 70	Present	Re-test another sample to verify the results. Eliminate cause, disinfect, and retest. Increase testing frequency; if recurrent problems persist, consult a water treatment professional for more advice. Some bacteria may cause serious illness or death.
Nitrate (NO3)	Annually	\$25 – 60	> 45 mg/L as NO3 or > 10 mg/L as N	Re-test another sample to verify the results. Install a treatment system or find an alternate water supply. Consult a water treatment professional for more advice.
Electrical Conductivity (EC)	Annually	\$10 – 40	> 1600 µmhos/cm or significantly different from previous result.	Test for minerals, nitrate, and/or VOCs to determine the possible cause of the high EC.
MINERALS: Aluminum (Al) Arsenic (As) Barium (Ba) Cadmium (Cd) Chromium (Cr) Fluoride (F) Iron (Fe) Lead (Pb) Manganese (Mn) Mercury (Hg) Selenium (Se) Silver (Ag)	Every 5-10 years or if significant changes occur, including EC values, taste, color, odor, or surrounding land use changes	Package \$200 – 350 Individual \$25 – 60 Arsenic \$50 – 70 Fluoride \$50 – 70 Mercury \$50 – 70	Al >0.2 mg/l As > 0.01 mg/l Ba >1.0 mg/l Cd >0.005 mg/l Cr >0.05 mg/l F >2.0 mg/l Fe >0.3 mg/l Pb >0.015 mg/l Mn >0.05 mg/l Hg >0.002 mg/l Se >0.05 mg/l Ag >0.1 mg/l	Compare to previous results. Consider retesting for any high results. Install a treatment system or find an alternate water supply. The appropriate treatment system depends on your overall water chemistry and the constituents that need to be removed. Consult a water treatment professional for more advice.
Volatile Organic Compounds (VOCs)	See MINERALS, above	Package \$150-350	Any detection	Ask lab to re-test. If confirmed, consult a water treatment professional for more advice.

* Some labs report minerals in micrograms per liter (µg/L). 1 milligram per liter (mg/L) is equal to 1,000 µg/L. > means greater than or equal to.

Interpreting Test Results

Third party water quality service providers may charge for laboratory result interpretation, be sure to request a quote before accepting any service. Assistance in interpreting sampling results may be provided from local environmental health agencies, state or federal websites, or other online resources.

The State of California does not regulate water quality in most private domestic wells, Counties or local agencies may have their own requirements. For example, some private domestic drinking water wells on farmland may be required to test for nitrate.

To determine if your wells water is safe to consume, we recommend comparing your water quality testing results with public supply well water quality benchmarks. Table 2 provides basic information and guidance for interpreting test results.

In general, if a constituent is reported above an MCL according to the EPA or the State then it is recommended the owner consider treatment. A list of MCLs, or relevant comparison concentration levels, can be found on the GAMA Groundwater Information System page for comparison concentrations.

Tests for Specific Water Quality Problems

Sometimes a problem with water quality may be obvious to the domestic well owner. These problems are often noticed due to a change in color, smell, or taste. Water quality may also cause physical reactions to sinks or other appliances by leaving stains and/or corrosion.

Table 3 outlines common problems in drinking water, and related constituents that can be tested for. Not every water quality issue is a health risk. For example, hard water is a result of high levels of calcium and magnesium in the water which can leave white staining but can still be safely consumed.

Less frequently encountered water quality problems are not described here. It is highly recommended that a water treatment professional be consulted when addressing any of these problems. It is still worth collecting a well water sample for minor concerns in case there are additional problems that cannot be observed.

Table 3: Possible causes of common taste, odor, and appearance problems in domestic wells and their associated treatment possibilities. Not all treatment types may be listed here. This is for informational purposes only and more research is recommended before implanting a treatment.

Problem	Possible Cause	Possible Treatments
Water is orange or reddish brown	High levels of iron (Fe)	Water softeners and iron filters
Porcelain fixtures or laundry are stained brown or black	Manganese (Mn) and/or iron (Fe) can cause staining	Reverse osmosis, water softener/ion

		exchange, and oxidizing filters
White spots on the dishes or white encrustation around fixtures	High levels of calcium (Ca) and magnesium (Mg) can cause hard water, which leaves spots	Water softener
Water is blue	High levels of copper (Cu)	Reverse osmosis
Water smells like rotten eggs	Hydrogen sulfide (H2S)	Oxidation, activated carbon filtration, shock chlorination, ion exchange, ozone treatment
Water heater is corroding	Water can be corrosive. Very corrosive water can damage metal pipes and water heaters	Acid-neutralizing filters, injecting sodium hydroxide or soda ash solution, replacement of metal piping
Water appears cloudy, frothy, or colored	Suspended particulates, detergents, and sewage can cause water to appear cloudy, frothy, or colored	Water softener, water filter
Your home’s plumbing system has lead pipes, fittings, or solder joints	Corrosive water can cause lead (Pb), copper (Cu), cadmium (Cd), and zinc (Zn) to leach from lead pipes, fittings, and solder joints	Replace lead piping
Water has a turpentine odor	Methyl tertiary butyl ether (MTBE) or other organic compounds	Activated carbon filtration
Water has a chemical smell or taste	Volatile or semi-volatile organic compounds (VOCs) or pesticides	Activated carbon filter, reverse osmosis

Water Quality Treatment

After a problem is identified with the private domestic well water, the owner may consider a variety of treatment methods. Even if a major problem is not identified, users often use filters to further purify their drinking water. These types of filters can be affixed to faucets or used in a water container. These types of filters are not necessarily what is referred to when treatment methods mention filters.

The method of treatment will depend on the problems identified in the water. An owner may utilize more than one treatment method depending on necessity and preference.

Examples of domestic well treatment systems include activated alumina filters, activated charcoal filters, air stripping, anion exchange, chlorination, reverse osmosis, ozonation, and ultraviolet radiation. The type of treatment system used will depend on the type of water quality issues that need to be addressed. Not all water treatment systems will work for every type of contaminant.

Most treatment systems require routine maintenance and upkeep. Improperly maintained systems can cause more damage than having no treatment at all. A treatment system, installation, and maintenance can be expensive. Consult a water treatment professional to identify the type of treatment needed for the specific situation. Finding a water treatment professional may be done by contacting the local county environmental health office or using internet resources. Acquire quotes before deciding.

Treatment systems may not be successful in every situation. In these cases, it may be necessary to drill a new well, or to obtain an alternative water supply.

Well Destruction

It is important to properly destroy wells when they are no longer. Unused and abandoned wells can allow groundwater contamination to the drinking water aquifer. To prevent contamination, the Department of Water Resources has developed standards for well destruction. Typically, the well casing is removed, if possible, and the abandoned well is filled with cement or similar compounds to prevent any water from migrating to the various aquifers. Similar to well construction, local environmental health agencies are responsible for specific well destruction standards, which includes a permit to perform work on the well. A state licensed well drilling contractor must complete the destruction.

Water Quality Protection

Preventing groundwater contamination is the best way to keep well water clean. Groundwater typically moves slowly, and contamination can take decades to naturally diminish. Under heavy precipitation, it has been shown that some constituents, such as nitrate, may migrate up to 33 ft into the subsurface from the land surface.

The unsaturated zone between the land surface and the groundwater table may provide some protection to the groundwater by filtering the recharge water. The further away possible contamination activities are from wells, the more soil is available to filter out constituents if an accidental spill or release occurs. Local health agencies may have legally mandated setback distances from the well location to the possible contamination zone. It is recommended that private domestic well owners check with their local agencies to determine the specific ordinances requiring setbacks for animal enclosures, septic systems, and other types of facilities.

The US EPA recommends that private well owners establish a “zone of protection” around their well. This zone should be considered off limits for storing, mixing, spraying, spilling, burying, or dumping anything that may contaminate the water supply.

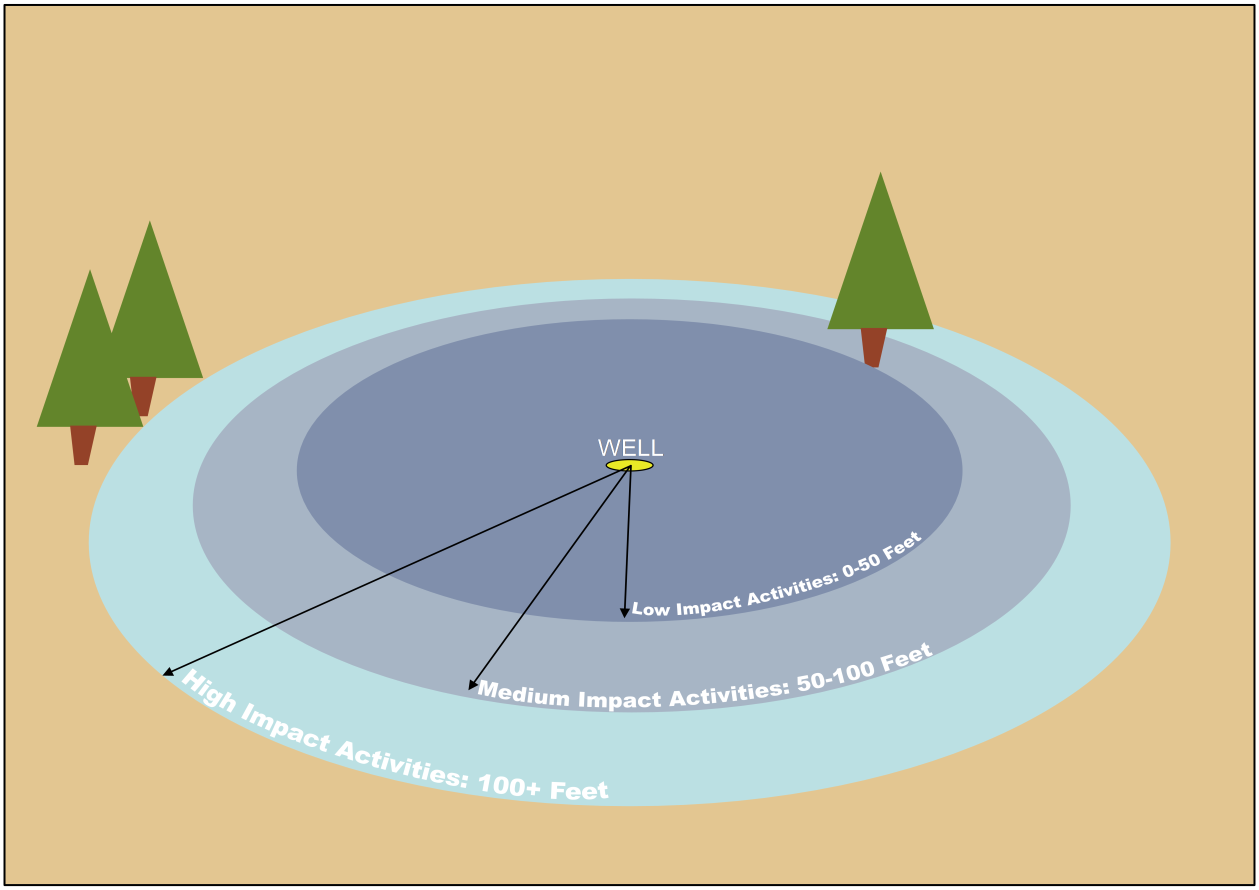


Figure 2: Diagram of zones of protection around a well.

Protect Your Well and Protect Your Water

There are several ways private domestic well owners can prevent degradation of their drinking water. The most important way is by observing setback distances from potential contamination points and their well. A common rule of thumb for setback distances follows three general categories: low impact activities (0-50 ft), medium impact activities (50-100ft), and high impact activities (100+ ft).

Low impact activities may occur in a 0–50-foot range and may include recreation areas, houses, outdoor furniture, and play areas. Medium impact activities may occur in a 50–100-foot range and may include garages, boats, and city sewer lines. High impact activities may occur at a range greater than 100-feet and may include chemical storage, animal enclosures, manure/compost piles, machine/auto repair, and septic systems. The ranges of impact activities directly reflect the chance of contaminating groundwater if an accident, such as a chemical spill, was to occur.

Do not mix or store any materials such as paint, pesticides, herbicides, or gasoline within 50 feet of a private domestic well. When using these products, such as painting a house near the well, care should be taken to not spill.

Do not dispose of hazardous materials (including some types of household cleaners, paint and paint cleaners, automotive waste, and pesticides) to a septic system. Septic systems do not treat these types of hazardous materials, and they can easily migrate to groundwater. Take hazardous chemicals to a designated collection center for disposal. In addition, septic systems should be located downhill (or downgradient) from a private domestic well, and at least 100 feet from any drinking water source.

If the well head, seal, or cement pad is damaged or improperly placed, surficial contaminants may get into the well casing and contaminate the drinking water. Wells should be inspected yearly for any damage. If there is damage, contact a State licensed well drilling contractor to repair the well. It is not recommended that the private domestic well owner attempt repairing the well on their own, as this can introduce more contaminants or make the problem worse in the future.

Resources Guide

There are many sources of information on private domestic wells. Programs that can help answer private domestic well water quality questions are provided below.

Local Government

County environmental health agencies are typically responsible for issuing well construction/abandonment/destruction permits, septic system permits, and address other issues associated with private domestic wells. Conduct an internet search to find the specific agency in your county responsible for private domestic well oversight. Some local agencies run hazardous household waste programs. Such programs typically offer tips for use, recycling, and disposal of these products.

State Government

The State of California does not regulate the water quality in private domestic wells. However, state agencies can be helpful in dealing with water quality issues and identifying threats to water quality. The State Water Board is responsible for the adjudication of water rights and water quality protection. Visit the State Water Board website at www.waterboards.ca.gov.

Groundwater Ambient Monitoring and Assessment (GAMA) Program: The GAMA Program is the State Water Board's comprehensive groundwater quality monitoring program for California. The main goals of GAMA are to improve statewide groundwater monitoring and to increase the availability of groundwater quality information to the public. Statewide data is accessible using GAMA Groundwater Information System

(GIS) which provides access to groundwater quality data in California. for raw or untreated groundwater, integrates data from multiple sources, and provides tools to analyze several datasets.

The State Water Board - Division of Drinking Water, (formerly part of the California Department of Public Health) is responsible for the regulation and monitoring of public water systems (a public water system serves 200 or more homes).

Regional Water Quality Control Boards (Regional Boards): The nine Regional Boards develop basin plans for their hydrologic areas, issue waste discharge requirements, take enforcement action against violators, and monitor water quality. Locate the Regional Board office for your area.

California Department of Water Resources: DWR provides groundwater level and water quality data.

California Department of Toxic Substances Control (DTSC): The DTSC can help answer questions about hazardous materials and waste: how to reduce household use, where to report dumping and spills, and proper disposal methods.

Federal Government

The Federal Government does not regulate water quality in private domestic wells. However, the US EPA provides helpful information to domestic well owners.

US EPA Safe Drinking Water Hotline: The Safe Drinking Water Hotline is available to help understand regulations and programs developed in response to the Safe Drinking Water Act. The hotline can be reached at (800) 426-4791. For more information, you can visit the website.

The US Centers for Disease Control and Prevention also provides some information on Private Well Sampling and Testing.