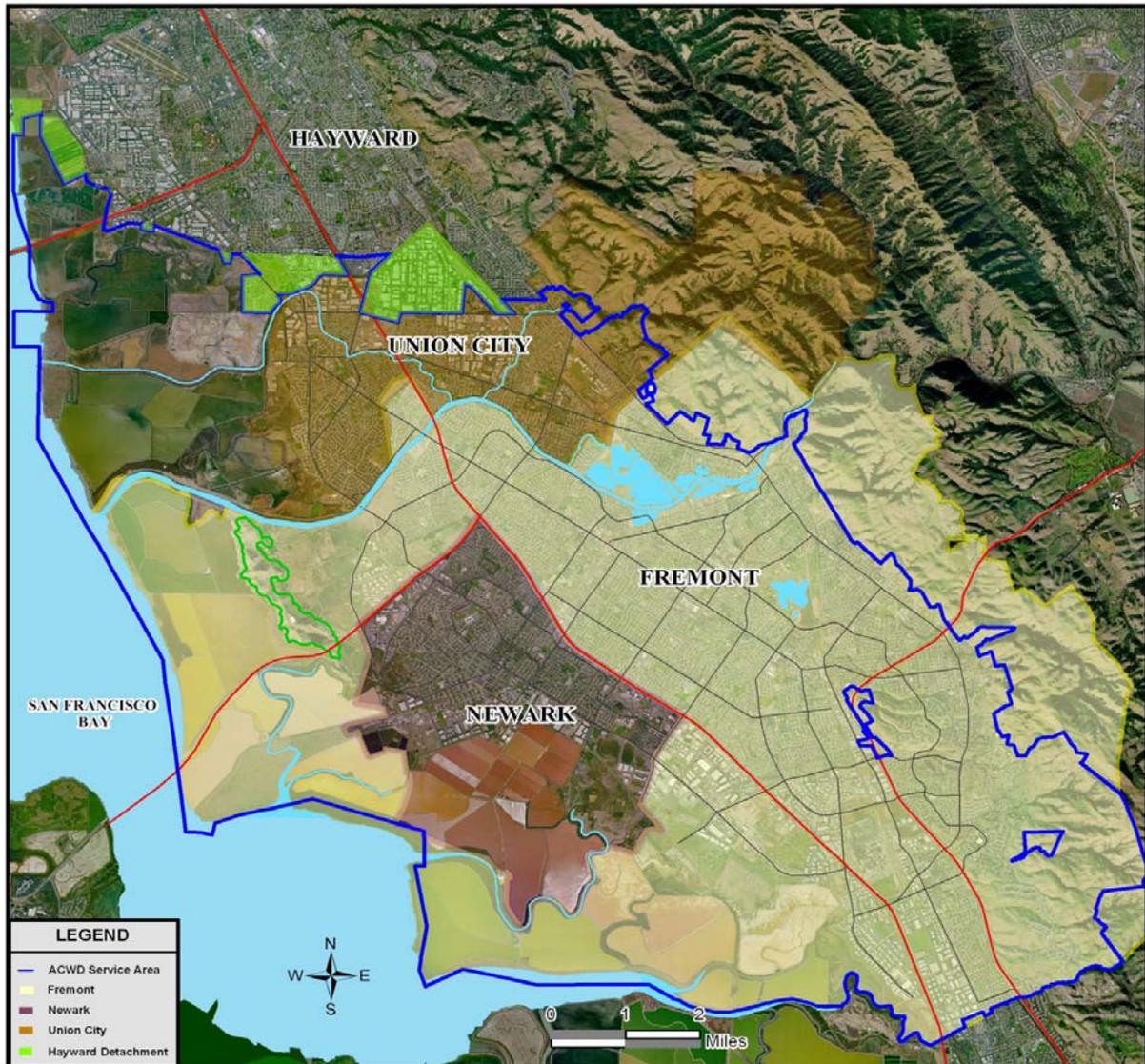


STANDARDS FOR  
THE CONSTRUCTION, USE, OPERATION, MAINTENANCE, REPAIR,  
INACTIVATION, OR DESTRUCTION OF WELLS, EXPLORATORY  
HOLES, OTHER EXCAVATIONS, AND APPURTENANCES



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## **Foreword**

The Alameda County Water District (District) is a local public agency, governed by a five member board of directors, elected at large, that provides drinking water to people in the Cities of Fremont, Newark, and Union City. The District was formed in 1914 by an act of the California Legislature for the purpose of protecting the water in the Niles Cone Groundwater Basin and conserving the water of the Alameda Creek Watershed. Local runoff along with imported water is percolated into the Niles Cone Groundwater Basin through recharge in Alameda Creek itself and through recharge ponds within the Quarry Lakes Regional Recreational Area and adjacent areas. The water is subsequently recovered through groundwater production wells and provided as potable supply to the District's customers. The District has production wells in each of the three cities within its boundaries. Thus, management and protection of the groundwater basin continues to be a high priority for the District.

The District conducts groundwater management and protection activities under the statutory authority granted to the District under the County Water District Law (commencing with Section 30000 of the Water Code); the Alameda County Water District Groundwater Protection Act (Division 12, Part 5, Chapter 1, Article 9.3, commencing with Section 31142.20 of the California Water Code) (Appendix A); Alameda County Water District Ordinance No. 2010-01 (Appendix B); the Replenishment Assessment Act of the Alameda County Water District (Chapter 1942 of the Statutes of 1961, as amended in 1970 and 1974), which grants additional powers to the District to prevent pollution, contamination, or diminution in quality of the groundwater supply; agreements with other agencies; and local hazardous materials ordinances.

The principle goal of these Standards is to protect the health, safety, and general welfare of the people of the cities of Fremont, Newark, and Union City by ensuring that the groundwater found wholly or partially within the area of the Cities will not be degraded, polluted, or contaminated by improper construction, use, operation, maintenance, repair, reconstruction, improvement, inactivation, decommissioning, or destruction of wells, exploratory holes, other excavations, and appurtenances. The Standards establish the minimum requirements for work on any well, exploratory hole, and other excavation. Ultimately, the technical adequacy of the work is the responsibility of the licensed contractor and permit applicants.

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# **1 Introduction**

## **1.1 Background**

These Standards have been developed by the Alameda County Water District (District) to protect the health, safety, and general welfare of the people of the Cities of Fremont, Newark, and Union City by ensuring that the groundwater within the area of the Cities will not be degraded, polluted or contaminated by improper construction, use, operation, maintenance, repair, reconstruction, improvement, inactivation, decommissioning, or destruction of wells, exploratory holes, other excavations, and appurtenances.

The District is the local enforcement agency for wells, exploratory holes, other excavations, and appurtenances in the Cities of Fremont, Newark, and Union City under the statutory authority granted to the District under the Alameda County Water District Groundwater Protection Act (Division 12, Part 5, Chapter 1, Article 9.3, commencing with Section 31142.20 of the California Water Code) (Appendix A) and Alameda County Water District Ordinance No. 2010-01 (Appendix B). Therefore, it is the District's responsibility to administer the ordinance and to develop the technical standards set forth herein.

The Standards are derived from water well industry procedures and processes deemed most effective at meeting local groundwater protection needs and are based on the standards developed by the State of California Department of Water Resources (DWR). These Standards establish the minimum requirements for work on any well, exploratory hole, other excavation, or appurtenances as defined herein.

## **1.2 Permits**

All work regulated by Alameda County Water District Ordinance No. 2010-01, requires a permit. Application for a permit may be obtained from the District's Engineering Department, at 43885 South Grimmer Boulevard, Fremont or online from the District's website at [http://www.acwd.org/engineering/drilling\\_permit.php5](http://www.acwd.org/engineering/drilling_permit.php5).

## **1.3 City of Hayward Detached Areas**

The City of Hayward Ordinance No. 00-04, adopted on July 18, 2000, amended Chapter 5 of Article 4 of the Hayward Municipal code to require the District's approval prior to the construction, operation, or destruction of wells in southern Hayward in areas that were formerly within the District's service area (Appendix C). For this reason, well drilling permits for southern Hayward must be obtained from Alameda County Public Works Agency; however, all work must be coordinated, inspected, and adhere to these Standards.

## **1.4 Replenishment Assessment Fee**

Under the authority of the Replenishment Assessment Act of the Alameda County Water District, the District charges operators of water production facilities an assessment based on the quantity of water produced (in acre-feet). Water wells, dewatering wells, extraction wells, shafts, tunnels, excavations, or other sources of groundwater could be considered water production facilities. Please visit the District's web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_mgt\\_raa](http://www.acwd.org/engineering/groundwater.php5#gwtr_mgt_raa) for additional information concerning the Replenishment Assessment Program and fees.

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## 2 Definitions

“Abandoned” shall mean any well, exploratory hole, or other excavation as defined in the Alameda County Water District Ordinance No. 2010-01

“Applicant” or “Permittee” shall mean the legal owner(s) of the property or person authorized by the owner on which a well, exploratory hole, or other excavation is to be constructed, repaired, inactivated or destroyed.

“Appurtenances” shall mean any part or feature of a well or other excavation necessary for its operation (e.g., column pipe, well pump or motor, or wellhead).

“Aquifer” shall mean a geologic formation from which groundwater may be extracted.

“Aquitard” shall mean a geologic formation with very low permeability.

“Construction” shall mean digging, driving, drilling, excavating, jetting, pushing, boring, casing, perforating, screening, gravel packing, deepening and/or sealing by any method of a new well, exploratory hole, or other excavation.

“Contamination” shall mean an impairment of the quality of waters of the state by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease and includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.

“Destruction” or “Destroy” shall mean the proper sealing of wells, exploratory holes, and other excavations to ensure that the groundwater supply is protected and preserved for future use and to eliminate potential physical hazards.

“District” shall mean the Alameda County Water District.

“Exploratory Hole” shall mean any temporary excavation that is open for less than 24 hours and constructed by any method, for the purpose of determining subsurface geological or hydrogeological information. An exploratory hole that is opened for less than 24 hours and used to inject fluids or other substances to enhance remediation at cleanup sites is also included within this definition. Exploratory holes are also known as exploratory boreholes, boreholes, or borings.

“Groundwater” shall mean the water beneath the natural surface of the ground, whether or not flowing through known and definite channels.

“Inactivation” or “Decommissioning” shall mean taking any well or other excavation temporarily out of service, and maintaining the well or other excavation in compliance with the provisions of Alameda County Water District Ordinance No. 2010-01 while it is temporarily out of service.

“Mud Pit” shall mean any excavated pit or enclosed structure that is used to confine drilling fluids so that the drilling fluids may be cycled, mixed, or temporarily stored.

“Ordinance” shall mean the Ordinance of the Alameda County Water District to Regulate Wells, Exploratory Holes, and Other Excavations within the Cities of Fremont, Newark, and Union City.

“Other Excavations” shall mean an excavation or structure, other than a well or an exploratory hole, constructed by any method that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer. The following structures are also deemed to be other excavations:

1. “Cathodic Protection Well” shall mean any artificial excavation constructed by any method for the sole purpose of installing equipment or facilities for the protection of metallic equipment in contact with the ground.
2. “Cleanup Site Excavation” shall mean an excavation associated with cleanup site activity under the oversight of a regulatory agency.
3. “Elevator Shaft” shall mean any cased structure constructed to contain the mechanism for an elevator system that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.
4. “Inclinometer” shall mean any artificial excavation constructed by any method for the purpose of monitoring ground movement.
5. “Shaft,” “Tunnel,” or “Directional Borehole” shall mean any passage or opening that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.
6. “Support Piers,” “Piles,” or “Caissons” shall mean any cased or uncased pier, pile, or caisson that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.
7. “Vibrating Wire Piezometer” shall mean a device used to monitor pore water pressures or the effects of ground improvement systems.
8. “Wick Drains” shall mean an artificial drainage system used to remove water from soil and accelerate the consolidation of compressible soil.

“Pollution” shall mean an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects the beneficial uses of water or facilities which serve these beneficial uses. Pollution may include contamination as defined herein.

“Repair,” “Reconstruction” or “Improvement” shall mean digging, driving, drilling, excavating, jetting, pushing, boring, casing, perforating, sleeving, removal of well casing, re-perforating, screening, gravel packing, deepening and/or sealing by any method of an existing well or other excavation.

“Use” or “Operation” shall mean to put into service or utilize a well or other excavation for its intended purpose.

“Well” shall mean any artificial excavation constructed by any method for the purpose of monitoring groundwater levels, extracting, injecting, or circulating water, or extracting, injecting, or circulating other fluid or gas solely for the purpose of soil or groundwater remediation beneath the natural surface of the ground. In addition, for purposes of these Standards, the following structures are also defined as wells:

1. “Agricultural Well” shall mean any well used to supply water only for irrigation of an agricultural crop.
2. “Community Domestic Well” shall mean any water well used to supply water for domestic purposes to a public water system as defined by the State of California, Department of Water Resources, Bulletin 74-81, Water Well Standards: State of California. Such wells are also referred to as “Municipal Wells,” “City Wells,” “Public Water Supply Wells” or “Small Water System Wells.”
3. “Dewatering Well” shall mean any cased hole used for the purpose of permanent dewatering or temporarily removing groundwater during construction or stabilizing hillsides or earth embankments.
4. “Domestic Well” shall mean any water well used to supply domestic water to one residential or commercial property.
5. “Extraction Well” shall mean any artificial excavation constructed by any method for the purpose of removing groundwater for cleanup of contamination.
6. “Geothermal Heat Exchange Well” shall mean any artificial excavation constructed by any method for the purpose of using the heat exchange capacity of the earth for heating and cooling. Geothermal heat exchange wells are also known as ground source heat pump wells.
7. “Horizontal Well” shall mean a well drilled horizontally or at an angle different from vertical.
8. “Industrial Well” shall mean any water well used to supply a specific industry.
9. “Injection Well” shall mean any artificial excavation constructed by any method for one of the following purposes:
  - a. Introducing water, treated water, or reclaimed water into the underground as a means of replenishing the groundwater basin.
  - b. Introducing gas, nutrients, fluids, or other compounds as a means of enhancing remediation of chemical constituents at clean-up sites or establishing hydraulic control.

10. “Monitoring Well” shall mean any artificial excavation constructed by any method for the purpose of monitoring fluctuations in groundwater levels, quality of groundwater, or the concentrations of contaminants in groundwater.
11. “Nested Wells” shall mean two or more casing strings within the same borehole.
12. “Vapor Well” shall mean any artificial excavation constructed by any method for the purpose of monitoring or extraction of vapors from the predominantly unsaturated zone above the water table.
13. “Water Well” shall mean any well constructed for the purpose of water supply. This includes community and domestic wells, and agricultural or industrial water wells, and injection water wells.

“Well Pump” shall mean any device or method which enables the extraction of water from a well.

## **3 Standards**

### **3.1 General**

These Standards apply to all wells, exploratory holes, other excavations, and appurtenances regulated under ACWD Ordinance No. 2010-01 (Appendix B), adopted on December 9, 2010, pursuant to the Alameda County Water District Groundwater Protection Act (Division 12, Part 5, Chapter 1, Article 9.3, commencing with Section 31142.20 of the California Water Code) (Appendix A). These Standards are derived from applicable sections or portions of sections of water well industry procedures and processes deemed most effective at meeting local groundwater protection needs.

Unless otherwise indicated in these Standards, the minimum standards are provided in DWR's Bulletin No. 74-2, "Water Well Standards: Alameda County" (June, 1964); Bulletin No. 74-81, "Water Well Standards: State of California" (December, 1981), together with the supplemental standards of DWR Bulletin No. 74-90, "California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells" (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District's web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Contractors shall call USA (Underground Service Alert) toll free at 811 or 1-800-227-2600 at least two working days (48 hours) before any subsurface work begins.

## 3.2 Water Well Construction

The following standards establish the minimum requirements for the construction of:

- water wells
- agricultural wells
- community domestic wells
- domestic wells
- horizontal wells
- industrial wells
- injection wells

Unless otherwise indicated in these Standards, the minimum standards are provided in DWR's Bulletin No. 74-2, "Water Well Standards: Alameda County" (June, 1964); Bulletin No. 74-81, "Water Well Standards: State of California" (December, 1981), together with the supplemental standards of DWR Bulletin No. 74-90, "California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells" (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District's website at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Specifications for water well construction are discussed in Part II of the Water Well Standards in DWR Bulletins 74-81 and 74-90 and in Chapter IV of DWR Bulletin 74-2. A typical water well construction is shown on Figure No. 1 in Appendix D.

Well Completion Report forms and instructions may be obtained by visiting DWR's website at [http://www.water.ca.gov/groundwater/well\\_info\\_and\\_other/well\\_completion\\_reports.cfm](http://www.water.ca.gov/groundwater/well_info_and_other/well_completion_reports.cfm).

### 3.2.1 Well Location with Respect to Contaminants and Pollutants

Specifications for well location with respect to contaminants and pollutants are discussed in Part II, Section 8 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

Wells shall be located an adequate horizontal distance from known or potential sources of contamination and pollution. Such sources include, but are not limited to: sanitary sewers; septic tanks and leach fields; sewage and industrial waste ponds; barnyard and stable areas; solid waste disposal sites; above and below ground storage tanks and pipelines for storage and conveyance of petroleum products or other chemicals; and, storage and preparation areas for pesticides, fertilizers, and other chemicals. In addition, consideration must also be given to ensure adequate separation from sites or areas with known or suspected soil or groundwater pollution or contamination.

The following horizontal separation distances are generally considered minimum distances; local conditions may require greater separation distances to ensure groundwater quality protection.

Potential Pollution or Contamination Source	Minimum Horizontal Distance Between Well and Known or Potential Source
<b>Any sewer line (sanitary; main or lateral)</b>	50 feet
<b>Watertight septic tank or subsurface sewage leaching field</b>	100 feet
<b>Cesspool or seepage pit</b>	150 feet
<b>Animal or fowl enclosure</b>	100 feet
<b>Above and below ground storage tanks and associated pipelines.</b>	100 feet
<b>Leaking Underground Fuel Tank Cleanup Sites and Spills, Leaks, Investigation, and Cleanup Sites</b>	150 feet
<b>Bioswales, Graywater or Porous Pavement Areas</b>	100 feet

### **3.2.2 Sealing the Upper Annular Space**

Specifications for sealing the upper annular space are discussed in Part II, Section 9 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

Drilling may be accomplished through a variety of methods. For the construction of all water wells, a drilling method should be chosen that is large enough to provide at least a two-inch annular space between the outside of the well casing and the borehole wall. The annular space between the borehole wall and casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants, contaminants from surface spills and leaks, or from poor-quality water flow between aquifers. The annular seal can also serve to protect the structural integrity of the well casing and to protect the casing from chemical attack and corrosion. In no case will an outer casing or conductor casing be an acceptable substitute for an annular seal.

#### *3.2.2.1 Minimum Depth of Seal*

The depth of the required annular seal for a water well will depend on the geologic setting and will be determined by the District on a case by case basis. During well construction, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not inter-aquifer groundwater flow (also known as intermingling) will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on water well construction that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District. At a minimum, an annular seal of fifty (50) feet is required for all new water wells.

### 3.2.2.2 *Wells that Penetrate Zones Containing Poor-quality Water, Pollutants, or Contaminants*

Geologic units known to contain poor-quality water, pollutants, or contaminants require precautions (*i.e.*, conductor casing) to isolate zones containing poor-quality water, pollutants, or contaminants during drilling and well construction operations. The precaution is necessary so that poor-quality water, pollutants, or contaminants do not move through the borehole during drilling and well construction operations, thereby significantly degrading groundwater quality in other units before sealing material can be installed. The District may consider substitutions to a conductor casing on a case-by-case basis, provided the proposed substitution is acceptable to the District and is equal to or exceeds these Standards in performance and level of protection. Additional information regarding conductor casings is located in Section 3.2.6.1.

### 3.2.2.3 *Sealing Materials and Placement*

#### (1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

#### (2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

#### (3) Minimum Set and Curing Time

The minimum time required for sealing materials containing Portland Cement to set and begin curing before construction operations on a well can be resumed is seventy-two (72) hours.

#### (4) Bentonite

A bentonite spacer or transition seal can be used, but is considered part of the gravel pack. Bentonite clay products must be specifically prepared for such use, and the preparation and placement of bentonite clay products shall follow the manufacturer's specifications. Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

#### (5) Radial Thickness of Seal

A minimum of two (2) inches of sealing material shall be maintained between the casing and the borehole wall, within the interval to be sealed. In addition, two (2) inches of sealing material shall be maintained between each casing, such as permanent conductor casing, well casing (including the diameter of joint areas), gravel fill pipes, etc.

#### (6) Centralizers

Well centralizers are to be attached to the well column every twenty-five (25) feet for water wells so that the well casing can be properly centered in the borehole. Centralizers shall be metal or plastic and must be positioned to allow the proper placement of sealing material around the casing within the interval to be sealed. Any metallic component of a

centralizer used with metallic casing shall consist of the same material as the casing. Metallic centralizer components shall meet the same metallurgic specifications and standards as the metallic casing to reduce the potential for galvanic corrosion of the casing.

(7) Placement

The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled.

(8) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(9) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

### **3.2.3 Surface Construction Features**

Specifications for surface construction features are discussed in Part II, Section 10 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

### **3.2.4 Disinfection and Other Sanitary Requirements**

Specifications for disinfection and other sanitary requirements are discussed in Part II, Section 11 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

Prior to the commencement of drilling each hole, the drilling equipment, such as drill stem and augers, shall be cleaned to avoid the introduction of off-site contamination or cross contamination between well installation activities.

#### *3.2.4.1 Disinfection*

All wells producing water for domestic use (i.e., drinking or food processing) shall be disinfected following construction, repair, or when work is done on the pump, before the well is placed in service.

#### *3.2.4.2 Gravel*

Gravel used in gravel-packed wells shall come from clean sources and should be thoroughly washed before being placed in the well. Gravel purchased from a supplier should be washed at the pit or plant prior to delivery to the well site.

During the placement of the gravel in the annular space, disinfectants (usually sodium hypochlorite in tablet or granular form) shall be added to the gravel at a uniform rate (two tablets per cubic foot or one pound of the granular form per cubic yard).

### **3.2.5 Casing**

Specifications for casing are discussed in Part II, Section 12 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

All casing materials used in well construction shall be new. All PVC casings shall be joined by flush threaded or locking bell joints; no glue, tape, or cements shall be used unless approved by the District. Casing shall be equipped with centering guides or “centralizers” to ensure the even radial thickness of the annular seal (see Section 3.2.2.3). The bottom of all well casings shall be plugged or capped to prevent sediment or rock from entering the well.

### **3.2.6 Sealing-off Strata**

Specifications for sealing-off strata are discussed in Part II, Section 13 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

#### *3.2.6.1 Conductor Casing*

Geologic units known to contain poor-quality water, pollutants, or contaminants require precautions (*i.e.*, conductor casing) to isolate zones containing poor-quality water, pollutants, or contaminants during drilling and well construction operations. The precaution is necessary so that poor-quality water, pollutants, or contaminants do not move through the borehole during drilling and well construction operations, thereby significantly degrading groundwater quality in other units before sealing material can be installed. The District may consider substitutions to a conductor casing on a case-by-case basis, provided the proposed substitution is acceptable to the District and is equal to or exceeds these Standards in performance and level of protection.

If a permanent conductor casing is to be installed to facilitate the construction of a well, steel casing must be used. In no case shall PVC casing be used as conductor casing. The conductor casing must be installed in an oversized hole at least four (4) inches greater in diameter than the outside diameter of the permanent conductor casing. The conductor casing must be driven or pushed a minimum of two to three feet into an aquitard above the aquifer where the well will be installed.

The annular space between the borehole wall and conductor casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants or contaminants from surface spills and leaks or from poor-quality water interaquifer flow.

#### *3.2.6.2 Multiple Screens*

Multiple screens may not be installed in more than one aquifer, if one or more of the aquifers contains water that, if allowed to mix in sufficient quantity, will result in a significant deterioration of the quality of water in the other aquifer(s) or the quality of water produced. The strata producing such poor-quality water shall be effectively sealed off to prevent entrance of the water into the well or its migration to other aquifer(s). In order to seal off questionable water quality, the depth of the annular seal of the well shall extend through the zone of poor-quality water and into the immediate overlying aquitard above the water-bearing zone in which the well is perforated or screened.

#### *3.2.6.3 Filter Material*

The gravel or filter pack shall not extend into any confining layers that overlie or underlie the targeted aquifer, unless otherwise approved by the District.

### **3.2.7 Well Development**

Specifications for well development are discussed in Part II, Section 14 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

If mechanical development procedures are to be used, the well seal must be allowed to bond to the casing for 72 hours prior to development.

### **3.2.8 Water Quality and Quantity for Individual Water Wells**

Specifications for water quality sampling are discussed in Part II, Section 15 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

The Alameda County Department of Environmental Health is the regulatory agency that oversees the quality and quantity requirements of the water for individual water wells and other sources such as springs. For questions regarding water quality and quantity requirements, please contact the Alameda County Department of Environmental Health at (510) 567-6700 or visit their web site at [http://www.acgov.org/aceh/septic/well\\_test.htm](http://www.acgov.org/aceh/septic/well_test.htm).

### **3.2.9 Rehabilitation, Repair, and Deepening of Wells**

Specifications for rehabilitation, repair, and deepening of wells are discussed in Part II, Section 18 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

### **3.2.10 Drilling Fluids and Cuttings**

Drilling fluids and cuttings shall be properly managed and disposed of in accordance with applicable local, regional, and state requirements. Discharge of drilling wastes into the sanitary sewer or storm drain is prohibited.

Mud pits created to confine drilling fluids shall be properly maintained during the well drilling operation. It shall be the permittee's responsibility to ensure that the mud pit is properly evacuated and backfilled upon completion of the job.

### **3.2.11 Temporary Cover**

Specifications for temporarily covering wells are discussed in Part II, Section 19 of the Water Well Standards in DWR Bulletins 74-81 and 74-90.

During any periods when no work is being performed on the well, such as overnight, the well and surrounding excavation shall be covered and secured. The cover shall be sufficiently strong and anchored to prevent the introduction of foreign material into the well and to protect the public from a potentially hazardous situation.

### 3.3 Water Well Destruction

The following standards establish the minimum requirements for the destruction of:

- water wells
- agricultural wells
- community domestic wells
- domestic wells
- horizontal wells
- industrial wells
- injection wells

Unless otherwise indicated in these Standards, the recommended minimum standards are provided in DWR's Bulletin No. 74-2, "Water Well Standards: Alameda County" (June, 1964); Bulletin No. 74-81, "Water Well Standards: State of California" (December, 1981), together with the supplemental standards of DWR Bulletin No. 74-90, "California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells" (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District's web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Specifications for well destruction are discussed in Part III of the Water Well Standards in DWR Bulletins 74-81 and 74-90 and under Chapter IV of DWR Bulletin 74-2.

If pollutants or contaminants are discovered during the well destruction process, it shall be the responsibility of the permittee to notify the proper agencies and to properly contain and dispose of contaminated materials.

#### 3.3.1 Steel Cased Wells

Before the well is destroyed, the motor, pump column and bowl assembly, etc., must be removed so that the well can be investigated to determine its condition, details of construction, and whether there are obstructions that will interfere with the process of sealing. This may include the use of a downhole camera for visual inspection of the well.

Steel cased wells must be redrilled or cleaned out to their original depth. The well shall be cleaned so that all undesirable materials and obstructions such as debris, oil from oil-lubricated pumps, or pollutants and contaminants that could interfere with well destruction are removed for disposal.

In order to destroy steel cased water wells, the casing must be ripped or perforated near the surface to prevent surface water intrusion and in aquitards between aquifers to prevent interconnection of the aquifers. Perforated zones are required for water well destructions in order to insure that sealing material fills any voids in the annular space and to prevent inter-aquifer flow, either through the well or outside of the casing. The well casing shall be ripped or perforated with a minimum 3/8-inch Mills Knife perforator. An alternate process to rip or perforate the casing may also be approved if it equals or exceeds this standard in performance and level of protection. In destroying gravel-packed wells, the sealing material will be placed within the casing and forced out under pressure into the gravel envelope through the perforated intervals. A typical steel cased water well destruction is shown on Figure No. 2 in Appendix D.

Sealing materials shall consist of the following:

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Bentonite

Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

The sealing material shall be placed in one of the following methods in one continuous operation until the specified interval or borehole is filled:

(1) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(2) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

After the well is properly sealed, a hole shall be excavated around the well casing to a depth of five (5) feet below ground surface and the well casing removed to the bottom of the excavation. Any well that is destroyed within a road right-of-way must be excavated to a depth of ten (10) feet below ground surface. The sealing material used for the upper portion of the well shall be allowed to spill over into the excavation to form a cap. After the well has been properly filled, including sufficient time for sealing material in the excavation to set, the excavation shall be backfilled to finished grade with compacted material, to conform to native conditions.

### **3.3.2 Non-Steel Cased Wells**

Before the well is destroyed, the motor, pump column and bowl assembly, etc., must be removed so that the well can be investigated to determine its condition, details of construction, and whether there are obstructions that will interfere with the process of sealing. This may include the use of a downhole camera for visual inspection of the well.

All PVC and other non-steel cased wells shall be destroyed by drilling and removing all well construction materials such as casing, screen, cement seal, gravel or sandpack, etc. to the full depth and diameter of the original boring; the hole shall then be backfilled with approved sealing materials. Sealing material and placement must conform to Section 3.3.1 of these Standards.

### 3.4 Monitoring Well Construction

The following Standards establish the minimum requirements for the construction of:

- monitoring wells for sampling
- monitoring wells for water levels
- extraction wells
- horizontal wells
- injection wells
- nested wells
- piezometers
- vapor monitoring wells
- vapor extraction wells
- vadose monitoring wells

Unless otherwise indicated in these Standards, the recommended minimum standards are provided in the DWR Bulletin No. 74-2, “Water Well Standards: Alameda County” (June, 1964); Bulletin No. 74-81, “Water Well Standards: State of California” (December, 1981), together with the supplemental standards of DWR Bulletin No. 74-90, “California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells” (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District’s web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Specifications for monitoring well constructions are discussed in Part II of the Monitoring Well Standards in DWR Bulletin 74-90. A typical monitoring well construction is shown on Figure No. 3 in Appendix D.

#### 3.4.1 Well Location with Respect to Contaminants and Pollutants

Specifications for monitoring well location with respect to contaminants and pollutants are discussed in Part II, Section 8 of the Monitoring Well Standards in DWR Bulletin 74-90.

Monitoring wells installed for the purpose of investigation or monitoring of cleanup sites are not subject to the minimum horizontal distance requirements. All other monitoring wells are subject to the same minimum horizontal distance requirements as water wells (Section 3.2.1).

#### 3.4.2 Sealing the Upper Annular Space

Specifications for sealing the upper annular space are discussed in Part II, Section 9 of the Monitoring Well Standards in DWR Bulletin 74-90.

Drilling may be accomplished through a variety of methods. For the construction of all monitoring wells, a drilling method should be chosen that is large enough to provide at least a two-inch annular space between the outside of the well casing and the borehole wall. The annular space between the borehole wall and casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants, contaminants from surface spills and leaks, or from poor-quality water flow between aquifers. The annular seal can also serve to protect the structural integrity of the well casing and to protect the casing from chemical attack and corrosion. In no case will an outer casing or conductor casing be an acceptable substitute for an annular seal.

#### 3.4.2.1 *Minimum Depth of Seal*

The depth of the required annular seal for monitoring wells will depend on the geologic setting and will be determined by the District on a case by case basis. During well construction, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not inter-aquifer groundwater flow (also known as intermingling) will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on monitoring well construction that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District.

The minimum seal requirement for monitoring wells installed in the shallow water-bearing zone is 5 feet below ground surface. Exceptions to the minimum seal depth may be approved by the District on a case by case basis for wells located in areas where shallow groundwater conditions are known to exist.

#### 3.4.2.2 *Wells that Penetrate Zones Containing Poor-quality Water, Pollutants, or Contaminants*

Geologic units known to contain poor-quality water, pollutants, or contaminants require precautions (*i.e.*, conductor casing) to isolate zones containing poor-quality water, pollutants, or contaminants during drilling and well construction operations. The precaution is necessary so that poor-quality water, pollutants, or contaminants do not move through the borehole during drilling and well construction operations, thereby significantly degrading groundwater quality in other units before sealing material can be installed. The District may consider substitutions to a conductor casing on a case-by-case basis, provided the proposed substitution is acceptable to the District and is equal to or exceeds these Standards in performance and level of protection. Additional information regarding conductor casings is located in Section 3.4.7.1.

#### 3.4.2.3 *Sealing Materials and Placement*

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Minimum Set and Curing Time

The minimum time required for sealing materials containing Portland Cement to set and begin curing before construction operations on a well can be resumed is seventy-two (72) hours.

(4) Bentonite

A bentonite spacer or transition seal can be used, but is considered part of the gravel pack. Bentonite clay products must be specifically prepared for such use, and the

preparation and placement of bentonite clay products shall follow the manufacturer's specifications. Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

(5) Radial Thickness of Seal

A minimum of two (2) inches of sealing material shall be maintained between all casings and the borehole wall, within the interval to be sealed. In addition, two (2) inches of sealing material shall be maintained between each casing, such as between a permanent conductor casing and the well casing.

(6) Centralizers

Well centralizers are to be attached to the well column every 15 feet in monitoring wells so that the well casing can be properly centered in the borehole. Centralizers shall be metal, plastic, or other non-degradable material and must be positioned to allow the proper placement of sealing material around the casing within the interval to be sealed. Centralizers are not required when constructing through the center of a hollow-stem auger. Any metallic component of a centralizer used with metallic casing shall consist of the same material as the casing. Metallic centralizer components shall meet the same metallurgic specifications and standards as the metallic casing to reduce the potential for galvanic corrosion of the casing.

(7) Placement

The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled.

(8) Free-fall Grouting

Sealing materials may be installed by "free-fall" from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(9) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

### **3.4.3 Surface Construction Features**

Specifications for surface construction features are discussed in Part II, Section 10 of the Monitoring Well Standards in DWR Bulletin 74-90.

The surface construction features should protect the well from unauthorized access, as well as, physical damage and the entrance of surface water, pollutants, and contaminants. Examples of surface construction features include, but is not limited to, a locking cover, water tight casing cap, concrete base or pad, traffic rated well boxes or vaults, and bollards. A typical flush

mounted traffic rated well box and a typical protective riser and bollard are shown on Figures No. 4 and 5 in Appendix D, respectively.

#### **3.4.4 Special Precautions for Areas of Known Contamination**

Appropriate safety measures should be applied in the possible presence of hazardous materials. Prior to the commencement of drilling each hole, the drilling equipment, such as drill stem and augers, shall be cleaned to avoid the introduction of off-site contamination or cross contamination between well installation activities.

#### **3.4.5 Filter Packs**

Specifications for filter packs are discussed in Part II, Section 11 of the Monitoring Well Standards in DWR Bulletin 74-90.

The filter pack shall not extend into any confining layers that overlie or underlie the water bearing zone to be monitored, unless otherwise approved by the District.

#### **3.4.6 Casing**

Specifications for casing are discussed in Part II, Section 12 of the Monitoring Well Standards in DWR Bulletin 74-90.

All casing materials used in well construction shall be new. All PVC cased wells shall have a minimum diameter of two (2) inches. All PVC casings shall be joined by flush threaded joints; no glue, tape, or cements shall be used. Casing shall be equipped with centering guides or “centralizers” to ensure the even radial thickness of the annular seal. Centralizers may not be required when constructing through the center of a hollow-stem auger.

For wells screened in the shallow water-bearing zone, the placement of the uppermost slot or perforation should reflect anticipated fluctuations in the water table. No well screens shall be allowed to connect two relatively permeable lenses which appear to be separated by a relatively impermeable zone without the approval of the District. The bottom of all monitoring well casings shall be plugged or capped to prevent sediment or rock from entering the well.

#### **3.4.7 Sealing-off Strata**

##### *3.4.7.1 Conductor Casing*

If a permanent conductor casing is to be installed to facilitate the construction of a well, steel casing must be used. In no case shall PVC casing be used as conductor casing. The conductor casing must be installed in an oversized hole, at least four (4) inches greater in diameter than the outside diameter of the permanent conductor casing. The conductor casing must be driven or pushed a minimum of two to three feet into an aquitard above the aquifer where the well will be installed. A typical monitoring well construction with a conductor casing is shown on Figure No. 6 in Appendix D.

The annular space between the borehole wall and conductor casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants or contaminants from surface spills and leaks or from poor-quality water interaquifer flow.

#### 3.4.7.2 *Multiple Screens*

Multiple screens may not be installed in more than one aquifer, if one or more of the aquifers contains water that, if allowed to mix in sufficient quantity, will result in a significant deterioration of the quality of water in the other aquifer(s) or the quality of water produced. The strata producing such poor-quality water shall be effectively sealed off to prevent entrance of the water into the well or its migration to other aquifer(s). In order to seal off questionable water quality, the depth of the annular seal of the well shall extend through the zone of poor-quality water and into the immediate overlying aquitard above the water-bearing zone in which the well is perforated or screened.

#### **3.4.8 Well Development**

Specifications for well development are discussed in Part II, Section 13 of the Monitoring Well Standards in DWR Bulletin 74-90.

All new groundwater monitoring wells shall be initially developed to clean the well and to stabilize the sand, gravel, and aquifer materials around the slots/perforations. Well development may be accomplished by bailing, mechanical or air lift pumping, surging or swabbing. If mechanical development procedures are to be used, the well seal must be allowed to bond to the casing for 72 hours prior to development. Since development can volatilize contaminants present, the well must be allowed to settle for at least 72 hours between development and the first purging/sampling event.

#### **3.4.9 Rehabilitation and Repair of Monitoring Wells**

Specifications for rehabilitation and repair are discussed in Part II, Section 14 of the Monitoring Well Standards in DWR Bulletin 74-90.

#### **3.4.10 Drilling Fluids and Cuttings**

Drilling fluids and cuttings shall be properly managed and disposed of in accordance with applicable local, regional, and state requirements. Discharge of drilling wastes into the sanitary sewer or storm drain is prohibited.

Mud pits created to confine drilling fluids shall be properly maintained during the well drilling operation. It shall be the permittee's responsibility to see that the mud pit is properly evacuated and backfilled upon completion of the job.

#### **3.4.11 Temporary Cover**

Specifications for temporary covers are discussed in Part II, Section 15 of the Monitoring Well Standards in DWR Bulletin 74-90.

During any periods when no work is being performed on the well, such as overnight, the well and surrounding excavation shall be covered and secured. The cover shall be sufficiently strong and anchored to prevent the introduction of foreign material into the well and to protect the public from a potentially hazardous situation.

### **3.4.12 Injection Wells**

Monitoring wells used to inject gas, water, or fluids to enhance remediation at cleanup sites are permitted on a case by case basis. These wells have been identified by the EPA as Class V Injection Wells. For more information regarding EPA reporting requirements please visit the EPA Region 9 website at <http://www.epa.gov/region09/water/groundwater/uic-classv.html> or email Elizabeth Janes at [janes.elizabeth@epa.gov](mailto:janes.elizabeth@epa.gov).

### 3.5 Monitoring Well Destruction

The following standards establish the minimum requirements for the destruction of:

- monitoring wells for sampling
- monitoring wells for water levels
- extraction wells
- horizontal wells
- injection wells
- nested wells
- piezometers
- vapor monitoring wells
- vapor extraction wells
- vadose monitoring wells

Unless otherwise indicated in these Standards, the recommended minimum standards are provided in DWR Bulletin No. 74-2, "Water Well Standards: Alameda County" (June, 1964); Bulletin No. 74-81, "Water Well Standards: State of California" (December, 1981), together with the supplemental standards of DWR Bulletin No. 74-90, "California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells" (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District's web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Specifications for monitoring well destructions are discussed in Part III of the Monitoring Well Standards in DWR Bulletin 74-90. A typical monitoring well destruction by hollow stem auger is shown on Figure No. 7 in Appendix D.

If pollutants or contaminants are discovered during the well destruction process, it shall be the responsibility of the permittee to notify the proper agencies and to properly contain and dispose of contaminated materials.

#### 3.5.1 Steel Cased Wells

Before the well is destroyed, all appurtenances must be removed so that the well can be investigated to determine its condition and details of its construction. The well shall be sounded to determine if there are obstructions that will interfere with the process of sealing. This may include the use of a downhole camera for visual inspection of the well.

Steel cased monitoring wells are subject to the same destruction requirements as water wells. If the steel well will be destroyed by overdrilling, then it shall be destroyed by drilling and removing all well construction materials such as casing, screen, cement seal, gravel or sandpack, etc. to the full depth and diameter of the original boring; the hole shall then be backfilled with approved sealing materials.

Sealing materials shall consist of the following:

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Bentonite

Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

The sealing material shall be placed in one of the following methods in one continuous operation until the specified interval or borehole is filled:

(1) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(2) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

### **3.5.2 Non-Steel Cased Wells**

Before the well is destroyed, all appurtenances must be removed so that the well can be investigated to determine its condition and details of its construction. The well shall be sounded to determine if there are obstructions that will interfere with the process of sealing. This may include the use of a downhole camera for visual inspection of the well.

All PVC and other non-steel cased wells shall be destroyed by drilling and removing all well construction materials such as casing, screen, cement seal, gravel or sandpack, etc. to the full depth and diameter of the original boring; the hole shall then be backfilled with approved sealing materials. Sealing material and placement must conform to Section 3.5.1 of these Standards.

### **3.6 Geothermal Heat Exchange Well Construction**

In April 1999, DWR issued draft well standards for geothermal heat exchange wells; however, DWR has not adopted the draft document as formal standards. Therefore, the following are the minimum requirements for geothermal heat exchange wells.

#### **3.6.1 Well Location with Respect to Contaminants and Pollutants**

Since geothermal heat exchange wells can act as vertical or horizontal conduits for contamination, geothermal heat exchange wells are subject to the same minimum horizontal distance requirements as water wells (Section 3.2.1).

#### **3.6.2 Construction and Sealing the Upper Annular Space**

The depth, diameter, and sealing material required for the annular seal for geothermal heat exchange wells will depend on the geologic setting and will be determined by the District on a case by case basis. During the permit approval process, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not intermingling will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on the seal requirements that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District.

#### **3.6.3 Allowed Fluid Systems**

In order to protect the groundwater basin, potable water is the only approved fluid for use in geothermal heat exchange systems.

### **3.7 Geothermal Heat Exchange Well Destruction**

All geothermal heat exchange wells that are no longer needed or have been classified as abandoned must be properly destroyed in order to protect the groundwater basin and to eliminate potential physical hazards.

Destruction specifications for geothermal heat exchange wells will be determined on a case by case basis and will depend on the location, geologic setting, and how the well was constructed. At a minimum, the casing and appurtenances must be removed and backfilled with approved sealing material to a depth specified by the District.

## **3.8 Dewatering Well Construction**

### **3.8.1 Permanent Dewatering Wells**

Permanent dewatering wells are subject to the same construction standards as water wells (Section 3.2).

### **3.8.2 Temporary Dewatering Wells**

Drilling may be accomplished through a variety of methods. The filter pack shall not extend into any confining layers that overlie or underlie the unit to be dewatered, unless otherwise approved by the District. A water tight cover shall be installed to prevent it from being a preferential pathway for the movement of pollutants, contaminants from surface spills and leaks.

Dewatering wells located within or adjacent to areas where known contaminated sites exist may impact the remediation and cleanup of those sites. Therefore, it shall be the permittee's responsibility to notify the appropriate local oversight agency as well as to ensure the proper disposal of the groundwater in accordance with Federal, State, and local regulations.

## **3.9 Dewatering Well Destruction**

### **3.9.1 Permanent Dewatering Wells**

Permanent dewatering wells are subject to the same destruction standards as water wells (Section 3.3).

### **3.9.2 Temporary Dewatering Wells**

Destruction specifications for temporary dewatering wells will be determined on a case by case basis and will depend on the location, geologic setting, and how the well was constructed. At a minimum, the casing and appurtenances must be removed and the borehole backfilled with approved sealing material to a depth specified by the District. Sealing material and placement must conform to Section 3.3.1 of these Standards.

### **3.10 Exploratory Holes**

Unless otherwise indicated in these Standards, the recommended minimum standards are provided in DWR Bulletin No. 74-90, "California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells" (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District's web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

All exploratory holes must be properly destroyed by backfilling the exploratory hole with approved sealing materials.

Sealing materials shall consist of the following:

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Bentonite

Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

The sealing material shall be placed in one of the following methods in one continuous operation until the specified interval or borehole is filled:

(1) Free-fall Grouting

Sealing materials may be installed by "free-fall" from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(2) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

#### **3.10.1 Special Provisions**

##### *3.10.1.1 Temporary Soil Vapor Sampling*

All temporary soil vapor probes and construction materials must be destroyed by overdrilling to the full depth and diameter of the original borehole the same day they are installed.

### *3.10.1.2 Percolation Tests*

All percolation tests must be completed the same day they are installed. All construction materials must be removed by over drilling to the full depth and diameter of the original borehole.

### *3.10.1.3 Injection Boreholes*

Exploratory boreholes used to inject gas or fluids to enhance remediation at cleanup sites are permitted on a case by case basis. These boreholes have been identified by the EPA as Class V Injection Wells. For more information regarding EPA reporting requirements please visit the EPA Region 9 website at <http://www.epa.gov/region09/water/groundwater/uic-classv.html> or email Elizabeth Janes at [janes.elizabeth@epa.gov](mailto:janes.elizabeth@epa.gov).

### *3.10.1.4 Direct Push or Cone Penetrometer Boreholes*

The sealing material for direct push and cone penetrometer test holes with a diameter less than 3 inches shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to six gallons of clean water.

## 3.11 Other Excavations

### 3.11.1 Cathodic Protection Well Construction

Unless otherwise indicated in these Standards, the recommended minimum standards are provided in DWR Bulletin No. 74-90, “California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells” (June, 1991), and subsequent revisions and/or supplements. Copies of these standards can be obtained by visiting the District’s web site at [http://www.acwd.org/engineering/groundwater.php5#gwtr\\_wo\\_dwr](http://www.acwd.org/engineering/groundwater.php5#gwtr_wo_dwr).

Specifications for cathodic protection well constructions are discussed in Part II of the Cathodic Protection Well Standards in DWR Bulletin 74-90. A typical cathodic protection well construction is shown on Figure No. 8 in Appendix D.

#### *3.11.1.1 Well Location with Respect to Contaminants and Pollutants*

Specifications for cathodic protection well location with respect to contaminants and pollutants are discussed in Part II, Section 6 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

Cathodic protection wells are subject to the same minimum horizontal distance requirements as water wells (Section 3.2.1).

#### *3.11.1.2 Sealing the Upper Annular Space*

Specifications for sealing the upper annular space are discussed in Part II, Section 7 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

Drilling may be accomplished through a variety of methods. For the construction of all cathodic protection wells, a drilling method should be chosen that is large enough to provide at least a two-inch annular space between the outside of the well casing and the borehole wall. The annular space between the borehole wall and casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants, contaminants from surface spills and leaks, or from poor-quality water flow between aquifers. The annular seal can also serve to protect the structural integrity of the well casing and to protect the casing from chemical attack and corrosion. In no case will an outer casing or conductor casing be an acceptable substitute for an annular seal.

#### *3.11.1.2.1 Minimum Depth of Seal*

The depth, diameter, and sealing material required for the annular seal for cathodic protection wells will depend on the geologic setting and the requirements of the metallic equipment to be protected and will be approved by the District on a case by case basis. During the permit approval process, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not intermingling will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on the seal requirements that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District.

### 3.11.1.2.2 Sealing Materials and Placement

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Minimum Set and Curing Time

The minimum time required for sealing materials containing Portland Cement to set and begin curing before construction operations on a well can be resumed is seventy-two (72) hours.

(4) Bentonite

A bentonite spacer or transition seal can be used, but is considered part of the gravel pack. Bentonite clay products must be specifically prepared for such use, and the preparation and placement of bentonite clay products shall follow the manufacturer's specifications. Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

(5) Radial Thickness of Seal

A minimum of two (2) inches of sealing material shall be maintained between all casings and the borehole wall, within the interval to be sealed. In addition, two (2) inches of sealing material shall be maintained between each casing, such as between a permanent conductor casing and the well casing.

(6) Centralizers

Well centralizers are to be attached to the well column every 25 feet in cathodic protection wells so that the well casing can be properly centered in the borehole. Centralizers shall be metal, plastic, or other non-degradable material and must be positioned to allow the proper placement of sealing material around the casing within the interval to be sealed. Centralizers are not required when constructing through the center of a hollow-stem auger. Any metallic component of a centralizer used with metallic casing shall consist of the same material as the casing. Metallic centralizer components shall meet the same metallurgic specifications and standards as the metallic casing to reduce the potential for galvanic corrosion of the casing.

(7) Placement

The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled.

(8) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(9) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

*3.11.1.3 Surface Construction Features*

Specifications for surface construction features are discussed in Part II, Section 8 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

The surface construction features should protect the well from unauthorized access, as well as, physical damage and the entrance of surface water, pollutants, and contaminants. Examples of surface construction features include, but are not limited to, a locking cover, casing cap, concrete base or pad, traffic rated well boxes or vaults, and bollards.

*3.11.1.4 Casing*

Specifications for casing are discussed in Part II, Section 9 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

All casing materials used in well construction shall be new. All PVC cased wells shall have a minimum diameter of two (2) inches. All PVC casings shall be joined by flush threaded joints; no glue, tape, or cements shall be used. Casing shall be equipped with centering guides or “centralizers” to ensure the even radial thickness of the annular seal. Centralizers may not be required when constructing through the center of a hollow-stem auger.

The bottom of all cathodic protection well casings shall be plugged or capped to prevent sediment or rock from entering the well.

*3.11.1.5 Sealing-Off Strata*

Specifications for sealing-off strata are discussed in Part II, Section 10 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

The annular space between the borehole wall and casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants or contaminants from surface spills and leaks or from poor-quality water interaquifer flow.

Anodes shall not be installed in more than one aquifer, if one or more of the aquifers contains water that, if allowed to mix in sufficient quantity, will result in a significant deterioration of the quality of water in the other aquifer(s) or the quality of water produced. The strata producing such poor-quality water shall be effectively sealed off to prevent entrance of the water into the

well or its migration to other aquifer(s). In order to seal off questionable water quality, the depth of the annular seal of the well shall extend through the zone of poor-quality water and into the immediate overlying aquitard above the water-bearing zone in which the anodes are placed.

#### *3.11.1.6 Repair of Cathodic Protection Wells*

Specifications for repair are discussed in Part II, Section 11 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

#### *3.11.1.7 Temporary Cover*

Specifications for temporary covers are discussed in Part II, Section 12 of the Cathodic Protection Well Standards in DWR Bulletin 74-90.

During any periods when no work is being performed on the well, such as overnight, the well and surrounding excavation shall be covered and secured. The cover shall be sufficiently strong and anchored to prevent the introduction of foreign material into the well and to protect the public from a potentially hazardous situation.

### **3.11.2 Cathodic Protection Well Destruction**

Destruction specifications for cathodic protection wells will be determined on a case by case basis and will depend on the location, geologic setting, and how the well was constructed. At a minimum, the casing, cables, and other construction materials and appurtenances must be removed and the borehole backfilled with approved sealing material to a depth specified by the District.

Sealing materials shall consist of the following:

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement-based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Bentonite

Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

The sealing material shall be placed in one of the following methods in one continuous operation until the specified interval or borehole is filled:

(1) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(2) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

**3.11.3 Cleanup Site Excavations**

Cleanup site excavations are associated with cleanup site activity under the oversight of either the Alameda County Department of Environmental Health (sites within the City of Newark), the District, the City of Fremont Fire Department, the City of Union City Fire Department, the California Department of Toxic Substances Control, or the California Regional Water Quality Control Board – San Francisco Bay Region. Cleanup site excavations that are not properly backfilled can act as a vertical conduit and may create preferential pathways that allow runoff to rapidly infiltrate the subsurface and bypass soils which have the capacity to remove pollutants and protect the groundwater supply. For this reason, cleanup site excavations are included in these Standards.

Cleanup site excavations must be backfilled in a manner that will prevent the creation of: 1) a preferential pathway that could allow runoff to rapidly infiltrate the subsurface, or 2) an interconnection of aquifers or water-bearing zones. This can be done by using a minimum of five feet of materials identified in Section 3.11.2 or by using clean, compacted, low permeability material near the top of the excavation so that groundwater is protected from surface contaminants or pollutants.

This requirement does not supersede any local, state or federal regulations, but is intended to supplement any other regulations.

**3.11.4 Elevator Shafts**

Elevator shafts are constructed similar to wells. A borehole is drilled and a casing is installed in the borehole. If the annular space between the borehole wall and the casing is not properly sealed, it can act as a vertical conduit and may create preferential pathways that allow runoff to rapidly infiltrate the subsurface and bypass soils which have the capacity to remove pollutants and protect the groundwater supply. For this reason, elevator shafts are included in these Standards.

The elevator shaft must be installed in an oversized hole, at least four (4) inches greater in diameter than the outside surface of the casing. The annular space between the borehole wall and casing must be effectively sealed to prevent it from being a preferential pathway for either the movement of pollutants or contaminants from surface spills and leaks or from poor-quality water interaquifer flow.

Sealing Materials and Placement:

(1) Water

The water used to prepare sealing mixtures must be of drinking water quality.

(2) Grout

The sealing material shall be a neat cement grout composed of one sack of Portland Type I/II Cement (94 lbs.) or Portland Type II/V to five gallons of clean water or a sand-cement slurry with a minimum of eleven (11) sacks of Portland Cement per cubic yard of sand-cement slurry. The sand-cement slurry must be mixed at a batch plant; mixing of sand-cement slurries onsite will not be allowed. Cement based sealing materials shall be mixed thoroughly to provide uniformity and ensure that no lumps exist.

(3) Minimum Set and Curing Time

The minimum time required for sealing materials containing Portland Cement to set and begin curing before construction operations on an elevator shaft can be resumed is seventy-two (72) hours.

(4) Bentonite

Bentonite is allowed as an additive to cement-based sealing mixes, at a ratio of up to 5% percent by weight of cement used. Bentonite shall not be used as a sealing material.

(5) Radial Thickness of Seal

A minimum of two (2) inches of sealing material shall be maintained between all casings and the borehole wall, within the interval to be sealed.

(6) Centralizers

Well centralizers are to be attached to the shaft column every 25 feet in elevator shafts so that the casing can be properly centered in the borehole. Centralizers shall be metal, plastic, or other non-degradable material and must be positioned to allow the proper placement of sealing material around the casing within the interval to be sealed. Centralizers are not required when constructing through the center of a hollow-stem auger. Any metallic component of a centralizer used with metallic casing shall consist of the same material as the casing. Metallic centralizer components shall meet the same metallurgic specifications and standards as the metallic casing to reduce the potential for galvanic corrosion of the casing.

(7) Placement

The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled.

(8) Free-fall Grouting

Sealing materials may be installed by “free-fall” from the surface if the interval to be sealed has less than five (5) feet of water present and the total depth is less than thirty (30) feet deep.

(9) Tremie Grouting

If five (5) feet or more of standing water is present or if there is more than a thirty (30) foot length to be sealed, the sealing material shall be placed by means of a tremie pipe (maximum diameter of 3 inches) lowered to within three (3) feet of the underlying layer of material or bottom of the well. The sealing material shall be placed in one continuous operation until the specified interval or borehole is filled. If a tremie pipe is used, the end of the tremie pipe shall remain in place in the sealing material until placement is complete.

The bottom of all elevator shafts shall be plugged or capped to prevent sediment or rock from entering the casing as well to prevent the escape of hydraulic fluids. For steel cased elevator shafts, the bottom may be sealed by welding a plate to the bottom of the casing or by installing a cement plug of adequate thickness. PVC casings must be installed with a PVC cap.

Elevator shaft destructions are subject to the same standards as water wells (Section 3.3).

### **3.11.5 Inclinometers**

Inclinometers are subject to the same standards as monitoring wells (Sections 3.4 and 3.5).

### **3.11.6 Shafts, Tunnels, or Directional Boreholes**

Shafts, tunnels, and directional boreholes are constructed similar to wells and exploratory holes, but at a much larger scale. An opening or passage is created by excavation or by drilling a borehole, and then a structure or casing is installed in the opening. If the annular space between the excavation or borehole wall and the structure/casing is not properly sealed, it can act as a vertical conduit and may create preferential pathways that allow runoff to rapidly infiltrate the subsurface and bypass soils which have the capacity to remove pollutants and protect the groundwater supply. For this reason, shafts, tunnels, and directional boreholes are included in these Standards.

The depth, diameter, and sealing material required for the annular seal for shafts, tunnels, and directional boreholes will depend on the geologic setting and will be determined by the District on a case by case basis. During the permit approval process, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not intermingling will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on the seal requirements that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District.

Shafts, tunnels, or directional boreholes must be constructed in a manner that will prevent the creation of: 1) a preferential pathway that could allow runoff to rapidly infiltrate the subsurface, or 2) an interconnection of aquifers or water-bearing zones. Destruction specifications for shafts, tunnels, or directional boreholes will be determined on a case by case basis and will depend on the location, geologic setting, and how the shaft, tunnel, or directional borehole was constructed.

### **3.11.7 Support Piers, Piles, or Caissons**

Support piers and caissons are frequently installed similar to wells and exploratory holes. An opening or passage is created by excavation or by drilling a borehole, and then the pier or caisson is constructed in the opening. Piles can also be installed similar to piers and caissons, but they can also be driven into the ground. If the annular space between the excavation or borehole wall and the support pier, pile, or caisson is not properly sealed, it can act as a vertical conduit and may create preferential pathways that allow runoff to rapidly infiltrate the subsurface and bypass soils which have the capacity to remove the pollutants and protect the groundwater supply. For this reason, support piers, piles, and caissons are included in these Standards.

The depth, diameter, and sealing material required for the annular seal for support piers, piles, and caissons will depend on the geologic setting and the requirements of the project and will be approved by the District on a case by case basis. During the permit approval process, the permittee shall provide some method for the determination of groundwater quality characteristics of the major aquifers penetrated so that a judgment can be made as to whether or not intermingling will be allowed. Such determination can consist of evaluation of data from adjacent wells, evaluation of samples of formation materials encountered, or by running a geophysical log. Final judgment on the seal requirements that would be required to prevent intermingling of waters of different qualities shall be at the discretion of the District.

Support piers, piles, and caissons must be constructed in a manner that will prevent the creation of: 1) a preferential pathway that could allow runoff to rapidly infiltrate the subsurface, or 2) an interconnection of aquifers or water-bearing zones. Destruction specifications for support piers, piles, and caissons will be determined on a case by case basis and will depend on the location, geologic setting, and how the support pier, pile, and caisson were constructed.

### **3.11.8 Vibrating Wire Piezometers**

Vibrating wire piezometers are often installed similar to wells. A borehole is drilled and a casing is installed with the vibrating wire equipment attached to the casing. Vibrating wire piezometers installed with either PVC or Steel casing are subject to the same standards as monitoring wells (Sections 3.4 and 3.5).

Vibrating wire piezometers installed without casing are subject to the same standards as exploratory holes (Section 3.10).

### **3.11.9 Wick Drains**

Wick drains are installed as an artificial drainage system used to remove water from soil and accelerate the consolidation of compressible soil. Since wick drains remain in place after the dewatering activities are completed, they may create preferential pathways that allow runoff to rapidly infiltrate the subsurface and bypass soils which have the capacity to remove pollutants and protect the groundwater supply. For this reason, wick drains are included in these Standards.

Wick drains must be destroyed in a manner that will prevent the creation of: 1) a preferential pathway that could allow runoff to rapidly infiltrate the subsurface, or 2) an interconnection of aquifers or water-bearing zones. This can be done by excavating the wick drains to a depth specified by the District and backfilling the excavation by using the materials identified in section 3.11.2 or by using clean, compacted, low permeability materials so that groundwater is protected from surface contaminants or pollutants.

### **3.12 Appurtenances**

All appurtenances connected to wells and other excavations shall be installed, repaired or maintained in such a manner that all openings are sealed from surface waters or the entrance of undesirable fluids or foreign matter, and to prevent accidental entry or unauthorized access.

Appurtenances may include, but is not limited to: 1) well pumps and motors; 2) openings designated to provide access to the wells for measuring water levels, sampling, chlorinating, or adding gravel; and 3) any pipes, cables, or equipment that is installed in the well or other excavation.

If a pump has been temporarily removed for repair or replacement, the well shall be adequately covered and secured to prevent injury to people and animals and to prevent the entrance of foreign material, surface water, pollutants, or contaminants into the well during the pump repair period.

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## **Appendices**

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**Appendix A**  
**ACWD Groundwater Protection Act**

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## Senate Bill No. 133

### CHAPTER 563

An act to add Article 9.3 (commencing with Section 31142.20) to Chapter 1 of Part 5 of Division 12 of the Water Code, relating to the Alameda County Water District.

[Approved by Governor October 11, 2009. Filed with  
Secretary of State October 11, 2009.]

#### LEGISLATIVE COUNSEL'S DIGEST

SB 133, Corbett. Groundwater: wells, exploratory holes, and other excavations.

(1) Existing law, the County Water District Law, provides for the formation and operation of county water districts, and specifies the powers and purposes of those districts.

This bill would authorize the Alameda County Water District, within described areas of its jurisdiction, to establish a permit program, and to take related action, with regard to the construction, operation, decommissioning, abandonment, or destruction of wells, exploratory holes, or other excavations for the purpose of protecting groundwater. The district would be authorized to establish a procedure for the abatement as a public nuisance of any abandoned or unused well, exploratory hole, or other excavation that creates or threatens to create a water contamination hazard. The bill would declare that any costs incurred by the district to abate the public nuisance are a lien and would require the district to record with the county any notice of a lien that is prepared by the district. Any person who applies for a land development permit or approval, within the areas described by the bill, would be required to obtain specified documentation from the district with regard to the property proposed to be developed. By imposing requirements on the district in connection with the regulation of wells, exploratory holes, and other excavations, the bill would impose a state-mandated local program.

The bill would state the findings and declarations of the Legislature concerning the need for special legislation.

(2) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

*The people of the State of California do enact as follows:*

SECTION 1. Article 9.3 (commencing with Section 31142.20) is added to Chapter 1 of Part 5 of Division 12 of the Water Code, to read:

Article 9.3. Alameda County Water District

31142.20. This article shall be known and may be cited as the Alameda County Water District Groundwater Protection Act.

31142.22. This article only applies to all property within the boundaries of the Cities of Fremont, Newark, and Union City.

31142.24. Unless the context requires otherwise, the definitions set forth in this section govern the construction of this article.

(a) "Aquifer" means a geologic formation from which groundwater may be extracted.

(b) "Aquitard" means a geologic formation with very low permeability.

(c) "Board" means the board of directors of the district.

(d) "District" means the Alameda County Water District.

(e) "Exploratory hole" means a temporary excavation constructed by any method, for the purpose of determining subsurface geological or hydrogeological information.

(f) "General manager" means the general manager of the district.

(g) "Groundwater" means water beneath the natural surface of the ground, whether or not flowing through known and definite channels.

(h) "Other excavation" means an excavation or structure, other than a well or an exploratory hole, constructed by any method that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.

(i) "Well" means any artificial excavation constructed by any method for the purpose of monitoring groundwater levels, extracting, injecting, or circulating water, or extracting, injecting, or circulating other fluid or gas solely for the purpose of soil or groundwater remediation, beneath the natural surface of the ground.

31142.26. The district may take the following actions within the boundaries of the Cities of Fremont, Newark, and Union City to carry out this article:

(a) Adopt, by ordinance, regulations the board deems necessary or proper to carry out this article.

(b) Inspect and investigate wells, exploratory holes, and other excavations and enforce regulations adopted by the board regarding the construction, use, maintenance, repair, improvement, decommissioning, or destruction of wells, exploratory holes, other excavations, and appurtenances.

(c) Take measurements, collect data, including samples of groundwater, and make analyses pertaining to wells and the use of groundwater within the district.

(d) Require persons or entities to obtain a permit from the district to construct, operate, decommission, abandon, or destroy a well, exploratory hole, or other excavation.

(e) Impose and collect fees to recover the cost of inspecting wells, exploratory holes, and other excavations and otherwise implement and enforce this article.

(f) Require the sealing of abandoned or unused wells according to regulations adopted by the board that are designed to protect groundwater from contamination.

31142.28. Any person applying for any land development permit or approval within the boundaries described in Section 31142.22 shall obtain documentation from the district indicating that existing wells or other excavations are in compliance with the regulations of the district or that no wells or other excavations have been identified within the boundaries of the property proposed to be developed.

31142.30. Any abandoned or unused well, exploratory hole, or other excavation that creates or threatens to create a water contamination hazard is a public nuisance. The board shall adopt, by ordinance, regulations to carry out this section.

31142.32. If the district determines that a public nuisance exists, it shall, by certified mail, notify the record owner of the property to abate the public nuisance. The notice of public nuisance shall describe the public nuisance and specify the time, date, and place for a hearing regarding the public nuisance. The hearing shall take place no sooner than 10 calendar days and no later than 60 calendar days from the date of mailing of the notice of public nuisance. At the hearing, district staff shall present evidence of a public nuisance and the record owner may present evidence to the general manager that a public nuisance does not exist or has been abated.

31142.34. If, after the hearing, the general manager determines that a public nuisance exists, the district shall, by certified mail, send a notice to the record owner requiring that the record owner abate the public nuisance within a specified time. The notice shall state that, unless the public nuisance is abated within the time specified by the district, the district may abate the public nuisance and the costs of the abatement will be assessed against the property.

31142.36. If the public nuisance is not abated within the time specified by the district in the notice, the district may abate the public nuisance. Any entry upon private property by the district for this purpose shall be preceded by written notice to the record owner of the property stating the date and place of entry and that the purpose of entry is to abate the public nuisance. If the mailed notice is returned undelivered, the district shall post a copy of the notice at the proposed entry point of the property at least five days prior to entry. Thereafter, the district may take all actions necessary to abate the public nuisance.

31142.38. (a) All costs incurred by the district in abating a public nuisance pursuant to this article are a lien upon the property.

(b) Notice of the lien shall include the name of the record owner, the property on which the nuisance was abated, and the amount of the lien. The notice of lien shall be recorded by the district in the Office of the Alameda County Recorder within one year after the date on which the district initially incurs costs to abate the public nuisance or within 90 days after the completion of the abatement of the public nuisance, whichever occurs first. Upon recordation of the notice of lien, the lien shall have the same force, effect, and priority as a judgment lien, except that it will attach only to the property described in the notice, and shall continue until released or otherwise discharged.

31142.39. All actions authorized by this article shall be undertaken in a manner that is consistent with the federal Clean Water Act (33 U.S.C. Sec. 1341 et seq.) and Division 7 (commencing with Section 13000).

SEC. 2. The Legislature finds and declares that this act, which applies only to the Alameda County Water District, is necessary to authorize that district to take action to protect the Niles Cone Groundwater Basin from contamination by regulating wells, exploratory holes, and other excavations within the boundaries of the Cities of Fremont, Newark, and Union City. The Legislature further finds and declares that a general statute cannot be made applicable within the meaning of Section 16 of Article IV of the California Constitution, and that the enactment of this special law is necessary for the conservation and use of that groundwater for the public good.

SEC. 3. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

**Appendix B**

**ACWD Ordinance No. 2010-01**

Prepared by

Michael A. Myers, Wall Observer Support Team

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Prepared by

Michael A. Myers, Wall Observer Support Team

Prepared by

Michael A. Myers, Wall Observer Support Team

Prepared by

Michael A. Myers, Wall Observer Support Team

RESOLUTION NO. 10-066

OF BOARD OF DIRECTORS OF ALAMEDA COUNTY WATER DISTRICT  
ADOPTING AN ORDINANCE OF THE ALAMEDA COUNTY WATER  
DISTRICT TO REGULATE WELLS, EXPLORATORY HOLES, AND OTHER  
EXCAVATIONS WITHIN THE CITIES OF FREMONT, NEWARK, AND UNION  
CITY

---

WHEREAS, effective January 1, 2010, the Alameda County Water District Groundwater Protection Act (“ACWD Groundwater Protection Act”) was added as Article 9.3 (commencing with Section 31142.20) to Chapter 1 of Part 5 of Division 12 of the California Water Code to provide a regional approach of regulating subsurface activities for the protection of groundwater within the cities of Fremont, Newark, and Union City;

WHEREAS, prior to the enactment of the ACWD Groundwater Protection Act, the District regulated wells, exploratory holes, and other excavations pursuant to authority delegated to the District by the Well Ordinances adopted in 1973 by the cities of Fremont, Newark, and Union City (collectively “Cities”);

WHEREAS, the District may adopt, by ordinance, regulations deemed necessary or proper to carry out the ACWD Groundwater Protection Act;

WHEREAS the District has determined it is necessary and proper to adopt an ordinance to regulate wells, exploratory holes, and other excavations that are similar to the Well Ordinances adopted by the Cities, but as updated to account for the changes that have occurred over the last 37 years in regulating subsurface activities;

WHEREAS, the Cities are currently exempt from permit fees under the Well Ordinances adopted by the Cities, and the Cities supported the passage of the ACWD Groundwater Protection Act with the understanding that the Cities would continue to be exempt from permit fees for activities related to wells, exploratory holes and other excavations; and

WHEREAS, the adoption of the District Ordinance is categorically exempt from the California Environmental Quality Act (“CEQA”) pursuant to Section 15307 of the CEQA regulations as an action taken by a regulatory agency as authorized by state law to assure the maintenance, restoration, or enhancement of a natural resource where the regulatory process involves procedures for the protection of the environment.

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the ALAMEDA COUNTY WATER DISTRICT that it adopts Ordinance No. 2010-01 titled, “An Ordinance of the Alameda County Water District to Regulate Wells, Exploratory Holes, and Other Excavations, within the Cities of Fremont, Newark, and Union City.”

BE IT FURTHER RESOLVED that the Board of Directors finds this action categorically exempt from CEQA and authorizes the filing of a Notice of Exemption.

PASSED AND ADOPTED this 9<sup>th</sup> day of December 2010, by the following vote:

AYES: Directors Huang, Gunther, Sethy, Weed, and Koller

NOES: None

ABSENT: None

/s/ MARTIN L. KOLLER  
Martin L. Koller, President  
Board of Directors  
Alameda County Water District

ATTEST:

APPROVED AS TO FORM:

/s/ ANDREW WARREN  
Andrew Warren, Assistant District Secretary  
Alameda County Water District

/s/ PATRICK T. MIYAKI  
Patrick T. Miyaki, Attorney  
Alameda County Water District

ORDINANCE NO. 2010-01

AN ORDINANCE OF THE ALAMEDA COUNTY WATER DISTRICT TO REGULATE WELLS, EXPLORATORY HOLES, AND OTHER EXCAVATIONS WITHIN THE CITIES OF FREMONT, NEWARK, AND UNION CITY

BE IT ORDAINED by the Board of Directors of ALAMEDA COUNTY WATER DISTRICT as follows:

**SECTION 1. PURPOSE AND AUTHORITY**

The purpose of this ordinance is to protect the health, safety, and general welfare of the people of the Cities of Fremont, Newark, and Union City, by ensuring that the groundwater within the area of the Cities will not be degraded, polluted or contaminated by improper construction, use, maintenance, repair, improvement, decommissioning, or destruction of wells, exploratory holes, other excavations, and appurtenances. This ordinance is adopted pursuant to the Alameda County Water District Groundwater Protection Act (Division 12, Part 5, Chapter 1, Article 9.3, commencing with Section 31142.20 of the California Water Code).

**SECTION 2. DEFINITIONS**

- (a) "Abandoned" shall mean any well, exploratory hole, or other excavation that meets any of the criteria outlined in Section 3(c).
- (b) "Abatement" shall mean any action required to eliminate a public nuisance, as defined by this ordinance.
- (c) "Applicant" or "Permittee" shall mean the legal owner(s) of the property or person authorized by the owner on which a well, exploratory hole, or other excavation is to be constructed, repaired, inactivated or destroyed.
- (d) "Appurtenances" shall mean any part or feature of a well or other excavation necessary for its operation (*e.g.*, column pipe, well pump or motor, or wellhead).
- (e) "Aquifer" shall mean a geologic formation from which groundwater may be extracted.
- (f) "Aquitard" shall mean a geologic formation with very low permeability.
- (g) "Board" shall mean the members of the Board of Directors of the Alameda County Water District.
- (h) "Destruction" or "Destroy" shall mean the proper sealing of wells, exploratory holes, and other excavations to ensure that the groundwater supply is protected and preserved for future use and to eliminate potential physical hazards.
- (i) "District" shall mean the Alameda County Water District.

- (j) “Exploratory Hole” shall mean any temporary excavation that is open for less than 24 hours and constructed by any method, for the purpose of determining subsurface geological or hydrogeological information. An exploratory hole that is open for less than 24 hours and used to inject fluids or other substances to enhance remediation at cleanup sites is also included within this definition. Exploratory holes are also known as exploratory boreholes, boreholes, or borings.
- (k) “General Manager” shall mean the General Manager of the District.
- (l) “Groundwater” shall mean the water beneath the natural surface of the ground, whether or not flowing through known and definite channels.
- (m) “Inactivation” or “Decommissioning” shall mean taking any well or other excavation temporarily out of service, and maintaining the well or other excavation in compliance with the provisions of this ordinance while it is temporarily out of service.
- (n) “Ordinance” shall mean this Ordinance of the Alameda County Water District to Regulate Wells, Exploratory Holes, and Other Excavations within the Cities of Fremont, Newark, and Union City.
- (o) “Other Excavations” shall mean an excavation or structure, other than a well or an exploratory hole, constructed by any method that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer. The following structures are also deemed to be other excavations for the purposes of this ordinance:
- (1) “Cathodic Protection Well” shall mean any artificial excavation constructed by any method for the sole purpose of installing equipment or facilities for the protection of metallic equipment in contact with the ground.
  - (2) “Cleanup Site Excavation” shall mean an excavation associated with cleanup site activity under the oversight of a regulatory agency.
  - (3) “Elevator Shaft” shall mean any cased structure constructed to contain the mechanism for an elevator system that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.
  - (4) “Inclinometer” shall mean any artificial excavation constructed by any method for the purpose of monitoring ground movement.
  - (5) “Shaft,” “Tunnel,” or “Directional Borehole” shall mean any passage or opening that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.
  - (6) “Support Piers,” “Piles,” or “Caissons” shall mean any cased or uncased pier, pile, or caisson that intersects an aquifer, or that may impact the integrity of any aquitard located directly above an aquifer.

- (7) "Vibrating Wire Piezometer" shall mean a device used to monitor pore water pressures or the effects of ground improvement systems.
- (8) "Wick Drains" shall mean an artificial drainage system used to remove water from soil and accelerate the consolidation of compressible soil.
- (p) "Person" shall mean any individual, trust, firm, joint stock company, corporation, association, or public agency.
- (q) "Public Nuisance" shall mean any abandoned or unused well, exploratory hole, or other excavation that creates or threatens to create a water contamination hazard. The following shall also be included within the definition:
  - (1) Any well, exploratory hole, or other excavation that is in violation of this ordinance.
  - (2) Any abandoned pit, well, or other excavation that is not covered, filled, or fenced securely and creates or threatens to create a physical hazard (Division 104, Part 9.5, Section 115700 of the California Health and Safety Code).
  - (3) Any artesian well which is not capped or equipped with a mechanical appliance which will readily and effectively arrest and prevent the flow of any water from the well (Division 1, Chapter 2.5, Article 4 of the California Water Code).
- (r) "Repair," "Reconstruction" or "Improvement" shall mean digging, driving, drilling, excavating, jetting, pushing, boring, casing, perforating, sleeving, removal of well casing, re-perforating, screening, gravel packing, deepening and/or sealing by any method of an existing well or other excavation.
- (s) "Use" or "Operation" shall mean to put into service or utilize a well or other excavation for its intended purpose.
- (t) "Water Contamination Hazard" shall mean a condition created by wells, exploratory holes, other excavations, or appurtenances into which poor or marginal quality water or other fluids will or may foreseeably flow and threaten to impair the quality of the groundwater.
- (u) "Well" shall mean any artificial excavation constructed by any method for the purpose of monitoring groundwater levels, extracting, injecting, or circulating water, or extracting, injecting, or circulating other fluid or gas solely for the purpose of soil or groundwater remediation, beneath the natural surface of the ground.
- (v) "Wellhead Protection Area" shall mean the surface and subsurface area surrounding a water well or wellfield used in connection with a public water system through which contaminants could enter the water well or wellfield.

### **SECTION 3. CLASSIFICATIONS**

All wells, exploratory holes, and other excavations shall be classified as one of the following: “Active,” “Inactive,” “Abandoned,” or “Destroyed.” The final determination as to the status of a well, exploratory hole, or other excavation will be made by the District.

#### **(a) Active**

An active classification is a well or other excavation that is in compliance with this ordinance and has been utilized at least once in the preceding 12 months for its intended purpose.

#### **(b) Inactive**

An inactive classification is a well or other excavation that is in compliance with this ordinance and has not been used for a period of 12 months for its intended purpose, but is maintained in such a condition that it could be used.

- (1) The owner of a well or other excavation who desires to place or maintain it in the inactive classification shall obtain from the District, at intervals set by the District, a permit verifying the inactive classification.
- (2) As evidence of the owner’s intention regarding continued use and as a condition of the permit, the owner shall properly maintain the well or other excavation in such a way that:
  - i. The well or other excavation has no defects which will permit the impairment of the quality of groundwater.
  - ii. The well or other excavation is appropriately protected to prevent accidental entry or unauthorized access of any person, entry by any animal, and entry of water, fluids, or foreign matter.
  - iii. The well or other excavation is marked so as to be easily visible and located.
  - iv. The area surrounding the well or other excavation is kept clear of brush, debris, and waste materials.
  - v. The well or other excavation shall be accessible by a drill rig so that work can be performed on the well or other excavation as needed.

#### **(c) Abandoned**

An abandoned classification is a well, exploratory hole, or other excavation that meets any of the following criteria:

- (1) A well or other excavation that has not been used in the preceding 12 months for its intended purpose and has not been issued a permit for inactive classification.
- (2) A well or other excavation that is no longer functional for its intended purpose.
- (3) An exploratory hole that is not completely filled with appropriate sealing material.
- (4) A well, exploratory hole, or other excavation that is not in compliance with this ordinance.

(d) Destroyed

A destroyed classification is a well, exploratory hole, or other excavation that has been destroyed in compliance with this ordinance.

#### **SECTION 4. GENERAL PROVISIONS**

(a) Declaration of Water Shortage Emergency

If the Board declares a water shortage emergency, then the Board may prohibit the issuance of new water well construction permits and may implement water use limitations throughout the water shortage emergency.

(b) Prohibition Areas

The District may prohibit the construction of any well, exploratory hole, or other excavation in a designated wellhead protection area near any water supply well owned and operated by the District.

(c) Wells on Land to be Developed

Any person applying for any land development permit or approval within the boundaries of the City of Fremont, Newark, and Union City, shall obtain documentation from the District indicating that existing wells or other excavations are in compliance with this ordinance or that no wells or other excavations have been identified within the boundaries of the property proposed to be developed. Examples of land development permits or approval include planning review permits, demolition permits, grading permits, rezoning or other land use changes.

The property owner shall ensure that all abandoned wells on the property are located and properly destroyed in compliance with this ordinance prior to the development of the property.

(d) Discovery of Contamination

Any person who detects or encounters contamination or pollution in either soil (3 feet or deeper) or groundwater, within any property not designated as or associated with an active investigation or cleanup site by a Federal, State, local agency, or the District, shall notify the

District within 24 hours of such detection. This requirement does not supersede any local, state or federal notification requirements, but is intended to supplement any other reporting requirements.

(e) Licensing Requirements

No person shall construct, repair, or destroy any well or exploratory hole unless the person responsible for that construction, repair, or destruction possesses a valid State of California C-57 Water Well Contractor's License. A C-57 License is also required for the construction, repair, or destruction of the following other excavations: 1) Cathodic Protection Wells, 2) Inclinerometers, and 3) Vibrating Wire Piezometers.

All other work shall be performed by a Contractor with the appropriate valid State of California license. All contractors must perform the work in accordance with all applicable Federal, State and local regulations.

(f) Backflow Prevention

All pump discharge pipes not open to the atmosphere shall be equipped with an automatic device to prevent backflow or back-siphonage into the well. Well systems that employ or have been modified to employ chemical feeders or injectors shall be equipped with a backflow prevention device approved by the District.

All property within the Cities of Fremont, Newark, and Union City containing a water connection to the District's water distribution system and a well, shall be reviewed to determine if the installation of a District approved backflow prevention device at the service connection of the water distribution system is required.

**SECTION 5. PROHIBITIONS**

(a) Work Without Permit

No person, within the Cities of Fremont, Newark, and Union City, will construct, repair, inactivate or destroy any well, exploratory hole, or other excavation without first obtaining a permit from the District.

(b) Threats to Water Quality

No person will construct, use, operate, maintain, repair, reconstruct, improve, inactivate, or decommission any well, exploratory hole, or other excavation that poses a threat to the quality of groundwater or does not meet standards established by this ordinance.

(c) Public Nuisance

No person will knowingly allow any well, exploratory hole, or other excavation that is classified as a public nuisance to exist on property owned or controlled by that person.

(d) Abandoned Wells, Exploratory Holes, or Other Excavations

No person will knowingly allow any abandoned well, exploratory hole, or other excavation to exist on property owned or controlled by that person.

(e) False Statements

No person will knowingly submit any false statement, record, or data in connection with a permit application.

**SECTION 6. STANDARDS**

(a) Minimum Standards

Minimum standards for the construction, use, operation, maintenance, repair, reconstruction, improvement, inactivation, decommissioning, or destruction of wells, exploratory holes, other excavations, and appurtenances are as set forth in:

- (1) This ordinance.
- (2) State of California Department of Water Resources Bulletin No. 74-2 “Water Well Standards: Alameda County” (June, 1964).
- (3) State of California Department of Water Resources Bulletin No. 74-81, “Water Well Standards: State of California” (December, 1981), together with the supplemental standards of the Department of Water Resources Bulletin No. 74-90, “California Well Standards; Water Wells, Monitoring Wells, and Cathodic Protection Wells” (June, 1991).
- (4) District “Standards for the Construction, Use, Operation, Maintenance, Repair, Inactivation, or Destruction of Wells, Exploratory Holes, Other Excavations, and Appurtenances,” which will be approved by the General Manager.
- (5) Subsequent revisions, updates, and supplements to the standards above.

(b) Best Available Technology

New materials and techniques that are developed in the future will be encouraged and permitted, contingent upon their approval by the District, if they equal or exceed standards in performance and level of protection.

(c) Variances

Upon making certain findings based upon unique circumstances, the District may grant a variance from any provision of the standards and prescribe alternative requirements in their place. The findings must determine that the granting of such a variance is consistent with the purposes and intent of this ordinance, that special conditions exist on the property that make

strict compliance with the standards infeasible, and the granting of the variance is necessary for the preservation and enjoyment of a substantial property right.

## **SECTION 7. PERMITS**

All persons performing any work regulated by this ordinance must obtain a permit issued by the District prior to the start of such work and must comply with all the conditions set forth in this ordinance, required by law, or established by the permit.

### **(a) Application**

- (1) The District shall prescribe and provide a form of application for the use of any applicant for a permit required by this ordinance. The application form will require the name and address of the applicant, the location and description of work to be done, purpose of the proposed work, and other pertinent information determined to be necessary by the District. In addition, drawings and specifications of the proposed work shall be submitted in an approved form for review.
- (2) A work plan is required for all chemical investigations and must be signed and stamped by the same Professional Geologist or Professional Civil Engineer that signed the permit application form.

### **(b) Fees and Costs**

The schedule of fees and costs will be those established and adopted by the Board. The Cities of Fremont, Newark, and Union City must apply for permits, but are exempt from paying the permit fee. Other governmental agencies shall pay permit fees unless otherwise contrary to Federal or State law.

### **(c) Guarantee of Performance**

If the applicant or permittee has violated this ordinance within five years of the date on the permit application, the District may require a guarantee of performance from the applicant or permittee. The applicant or permittee shall post with the District a cash deposit or bond guaranteeing compliance with the terms of this ordinance and the applicable permit prior to the issuance of a permit. The bond or cash deposit shall guarantee the faithful performance of all conditions of the permit, including the replacing of, or making acceptable, any defective, faulty, or uncompleted work. The bond or cash deposit shall be maintained in full force and effect until each and every one of the conditions of the permit is completed. The amount of said bond or deposit shall be 100 percent (100%) of the total estimated costs of the work and 100% of the total estimated costs incurred by the District to oversee said work.

### **(d) Permit Approval**

Upon satisfactory completion of a permit application, the District shall issue the applicant a permit containing such conditions as are necessary to fulfill the purposes of this ordinance.

Permit approval shall be for a specific type and scope of work; any additional work not approved under the permit may require an additional permit and fees.

(e) Compliance with Other Regulations

The issuance of any permit pursuant to this ordinance shall not relieve the permittee from complying with any applicable federal, state, county, and local regulations, or from obtaining any permits or consent required by other federal, state, or local governmental agencies.

(f) Scheduling Work

It shall be the responsibility of the permittee to coordinate, schedule and confirm with the District the start date, start time, and the number of days necessary to complete the proposed permitted work. Prior to scheduling a starting date, the permittee must submit a satisfactorily completed permit application with the appropriate fees. The District will attempt to accommodate scheduling requests; however, all scheduling decisions shall be at the discretion of the District.

(g) Permit at Work Site

It shall be the responsibility of the permittee to maintain a copy of the permit at the work site during all stages of permitted activities.

(h) Chemical Testing Results

Any chemical tests conducted on soil, vapor, or groundwater samples collected from work related to a permit under this ordinance shall be submitted to the District within thirty (30) calendar days after completion.

(i) Well Completion Report

A copy of the Well Completion Report (Department of Water Resources Form 188), required by California Water Code Section 13751, shall be submitted to the District within sixty (60) calendar days after completion. The District may request any geologic information obtained during the construction of an exploratory hole or other excavation. If requested, the geologic information shall be submitted to the District within sixty (60) calendar days after completion.

(j) Liability

Permittee shall be responsible for all liability for personal injury or property damage caused by work permitted and done by permittee under the permit, or caused by failure on permittee's part to satisfactorily perform any obligation under the permit. District review of drawings, designs, specifications, work plans, reports or incidental work and materials shall not relieve the permittee of responsibility for the technical adequacy of their work. If any claim of such liability is made against the District, its officers, employees, or agents, permittee shall defend, indemnify and hold them and each of them, harmless from such claim.

(k) Permit Expiration

The permittee shall complete the work authorized by the permit prior to the expiration date indicated on the issued permit.

(l) Term and Completion of Work

The permittee shall complete the work authorized by a permit issued pursuant to this ordinance within sixty (60) calendar days from the date of issuance unless a different completion date is stated in the permit. If the work is not begun within sixty (60) days or within the time stated in the permit and the permittee has not requested the permit to be cancelled, then the permit shall become void and the permit fee shall be retained. After a permit is voided, the permittee must resubmit both application and required fees to proceed with work. If the permitted work is started within the sixty (60) calendar days from the date stated in the permit and then stopped, and the work is not completed before the permit expiration date, the permit will be deemed to be an expired permit.

Once the work authorized by the permit has been satisfactorily completed, the permit will be deemed to be complete and will be closed by the District. Wells or other excavations constructed, repaired, or reconstructed in compliance with this ordinance will be assigned an active classification so long as the well or other excavation is utilized at least once a year for its intended purpose. If a well or other excavation will not be used during the following year, then a permit for inactive classification must be obtained.

(m) Permit for Inactive Classification

A permit for inactive classification must be obtained for any well or other excavation which will not be used for a period of twelve (12) months, but which the owner intends to use in the future. Permits for inactive classification must be renewed annually and must be issued on or prior to the expiration date on the current permit for inactive classification. As a condition of issuance of a permit for inactive classification, the well or other excavation must be maintained in such a manner as to meet all current standards set forth in this ordinance.

If the well or other excavation is not activated or if a plan to activate the well or other excavation is not submitted to the District within twelve (12) months after issuance of the tenth consecutive permit for inactive classification, the permittee will be denied the issuance of any additional permits for inactive classification. Written notice will be given to the permittee that the well or other excavation is in violation of this ordinance and shall be classified as abandoned and must be destroyed in accordance with this ordinance.

If a well or other excavation has not been in use during any twelve (12) month period and a permit for inactive classification has not been issued, then the well or other excavation shall be classified as abandoned and must be destroyed in accordance with this ordinance.

(n) Permit Denial

The District will deny an application for a permit if:

- (1) The applicant is not a person authorized to perform the work as provided by this ordinance.
- (2) The permit application is incomplete.
- (3) The proposed work does not meet the standards set forth in this ordinance.
- (4) The proposed work does not meet the purpose of this ordinance.
- (5) The applicant has an issued permit that is out of compliance. No additional permits will be issued to any person who has a District permit that is not in compliance with that permit until the compliance issues are resolved.
- (6) The applicant is (a) requesting a permit for construction or reconstruction of a well, exploratory hole, or other excavation, and (b) there is an abandoned well, exploratory hole, or other excavation as designated in Section 3, located within the boundaries of the property in the permit application.

(o) Permit Review

Any person aggrieved by the refusal of a permit, the terms of a permit, or any decision made regarding the permit may, upon request in writing, have the matter reviewed by the General Manager or the General Manager's designee. Upon request for review, the matter shall be scheduled for review by the General Manager or the General Manager's designee and the applicant shall be given fifteen (15) days' written notice of the time and place of said review. Following the review, a decision will be made by the General Manager or the General Manager's designee. The decision of the General Manager shall be final and binding upon all parties.

**SECTION 8. INSPECTION**

Representatives of the District shall have the right to enter upon any premises at all reasonable times to inspect and investigate wells, exploratory holes, and other excavations, take measurements, collect data, including samples of groundwater, and make analyses pertaining to wells and the use of groundwater within the District. The representatives of the District shall first present proper credentials and request entry. If the premises are unoccupied, a reasonable effort will be made to locate the owner or other person having control of the property. A reasonable effort may include but is not limited to phone calls, written notification, and/or site visits. If entry is refused, the District may seek assistance from other agencies as needed to obtain entry.

**SECTION 9. ORDINANCE VIOLATION**

In the event a well, exploratory hole, other excavation, or appurtenances subject to this

ordinance is: 1) in violation of this ordinance, or 2) constructed, repaired, inactivated, or destroyed in violation of the terms of the permit issued pursuant to this ordinance, the District shall give written notice to the person owning the land as shown on the most recent equalized assessment roll, or to the permittee at the address listed on the permit. The notice shall state the nature of the violation, the corrective measures to be taken, the time within which such corrections must be made, and that if the land owner or permittee fails to make corrections within the period specified, the District may determine that the well, exploratory hole, or other excavation is a public nuisance.

## **SECTION 10. PENALTY FOR FAILURE TO OBTAIN PERMIT**

Whenever the District discovers a person drilling a well, exploratory hole, or other excavation subject to this ordinance without a valid permit, the District will direct the person to: 1) cease and desist drilling activities; and 2) take appropriate actions to achieve compliance with the ordinance.

Any person who commences any work for which a permit is required by this ordinance without having obtained a permit, shall be required to obtain a permit, pay all applicable permit fees and costs, and pay a fee for performing work without a permit as established and adopted by the Board. Additional actions may be required to demonstrate that work performed was done in conformance with the standards designated in Section 6.

## **SECTION 11. PUBLIC NUISANCE**

### **(a) Notification and Hearing**

If the District determines that a public nuisance exists, it shall, by certified mail, notify the record owner of the property to abate the public nuisance. The notice of public nuisance shall describe the public nuisance and specify the time, date, and place for a hearing regarding the public nuisance. The hearing shall take place no sooner than 10 calendar days and no later than 60 calendar days from the date of mailing of the notice of public nuisance. At the hearing, District staff shall present evidence of a public nuisance and the record owner may present evidence to the General Manager that a public nuisance does not exist or has been abated.

### **(b) Abatement Notification**

If, after the hearing, the General Manager determines a public nuisance exists, the District shall, by certified mail, send a notice to the record owner requiring that the record owner abate the public nuisance within a specified time. The notice shall state that, unless the public nuisance is abated within the time specified by the District, the District may abate the public nuisance and the costs of the abatement will be assessed against the property.

### **(c) Abatement Procedures**

If the public nuisance is not abated within the time specified by the District in the notice, the District may abate the public nuisance. Any entry upon private property by the District for this purpose shall be preceded by written notice to the record owner of the property stating the

date and place of entry and that the purpose of entry is to abate the public nuisance. If the mailed notice is returned undelivered, the District must post a copy of the notice at the proposed entry point of the property at least five days prior to entry. Thereafter, the District may take all actions necessary to abate the public nuisance.

(d) Lien Procedures

All costs incurred by the District in abating a public nuisance pursuant to this act are a lien upon the property.

Notice of the lien must include the name of the record owner, the property on which the nuisance was abated, and the amount of the lien. The notice of lien shall be recorded by the District in the Office of the Alameda County Recorder within one year after the date on which the District initially incurs costs to abate the public notice or within 90 days after the completion of the abatement of the public nuisance, whichever occurs first. Upon recordation of the notice of lien, the lien shall have the same force, effect, and priority as a judgment lien, except that it will attach only to the property described in the notice, and shall continue until released or otherwise discharged.

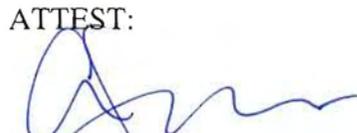
PASSED AND ADOPTED this 9<sup>th</sup> day of December 2010, by the following vote:

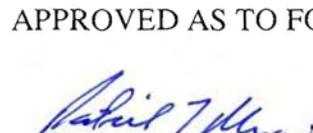
AYES: Directors Huang, Gunther, Sethy, Weed, and Koller

NOES: None

ABSENT: None

  
\_\_\_\_\_  
Martin L. Koller, President  
Board of Directors  
Alameda County Water District

ATTEST:  
  
\_\_\_\_\_  
Andrew Warren, Assistant District Secretary  
Alameda County Water District

APPROVED AS TO FORM:  
  
\_\_\_\_\_  
Patrick T. Miyaki, Attorney  
Alameda County Water District

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**Appendix C**

**City of Hayward Municipal Code  
Article 4 - Well Standards**

Prepared by

Michael A. Myers, Wall Observer Support Team

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Reviewed by

John D. Long, Government Research Analyst

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Approved by

John D. Long, Director of Planning

ARTICLE 4

WELL STANDARDS

Section	Subject Matter
5-4.00	TITLE
5-4.10	COUNTY OF ALAMEDA ORDINANCE NO. 73-68 ENTITLED "AN ORDINANCE TO REGULATE THE CONSTRUCTION, REPAIR, RECONSTRUCTION, DESTRUCTION OR ABANDONMENT OF WELLS WITHIN THE BOUNDARIES OF THE COUNTY OF ALAMEDA", ADOPTION BY REFERENCE
5-4.20	ADMINISTRATION AND ENFORCEMENT  WELL WATER REPLENISHMENT CHARGES
5-4.50	PURPOSE
5-4.51	DETACHED AREA DEFINED
5-4.52	WELL WATER REPLENISHMENT CHARGES APPLICABLE TO THE AREA DETACHED IN 1973
5-4.53	WELL WATER REPLENISHMENT CHARGES APPLICABLE TO THE AREAS DETACHED IN 2000 AND 2004
5-4.54	CONSTRUCTION, OPERATION, OR DESTRUCTION OF WELLS
5-4.55	AMENDMENTS TO REPLENISHMENT ASSESSMENT

## ARTICLE 4

### WELL STANDARDS

SEC. 5-4.00 TITLE. This article shall be known as the "Well Standards Ordinance of the City of Hayward", adopting by reference the well standards of the County of Alameda, in order to provide uniform regulations consistent with the County of Alameda for the construction, repair, reconstruction, destruction or abandonment of wells within the City of Hayward.

SEC. 5-4.10 COUNTY OF ALAMEDA ORDINANCE NO. 73-68 ENTITLED "AN ORDINANCE TO REGULATE THE CONSTRUCTION, REPAIR, RECONSTRUCTION, DESTRUCTION OR ABANDONMENT OF WELLS WITHIN THE BOUNDARIES OF THE COUNTY OF ALAMEDA", ADOPTION BY REFERENCE. The well standards regulations of the County of Alameda adopted by Ordinance No. 73-68 on the 17th day of July, 1973 and entitled, "An Ordinance to Regulate the Construction, Repair, Reconstruction, Destruction or Abandonment of Wells Within the Boundaries of the County of Alameda" is hereby adopted as the well standards ordinance of the City of Hayward regulating the construction, repair, reconstruction, destruction or abandonment of wells within the City of Hayward.

Three printed copies of such Alameda County regulations (primary code) and three printed copies of Chapter II of the Department of Water Resources Bulletin No. 74, "Water Well Standards: State of California" and Appendixes E, F and G a part thereof, together with the supplemental standards of Department of Water Resources Bulletin No. 74-2, "Water Well Standards: Alameda County" and Department of Water Resources Bulletin No.74-1, "Cathodic Protection Wells Standards: State of California" (secondary code), are on file in the office of the City Clerk, to which reference is hereby made for further particulars.

SEC. 5-4.20 ADMINISTRATION AND ENFORCEMENT. The Alameda County Public Works Department, through the Alameda County Flood Control and Water Conservation District, is hereby granted jurisdiction to administer and enforce these regulations on behalf of the City of Hayward.

### WELL WATER REPLENISHMENT CHARGES

SEC. 5-4.50 PURPOSE. The imposition of the replenishment charges as hereinafter provided is to comply with certain conditions imposed by the Local Agency Formation Commission of Alameda County by its Resolution No. 73-24 dated September 27, 1973, approving the "Hayward Detachment from the Alameda County Water District".

SEC. 5-4.51 DETACHED AREA DEFINED. REAL PROPERTY in the City of Hayward, County of Alameda, State of California, lying within the boundaries of the Alameda County Water District, as said boundaries were established by the Board of Supervisors of Alameda County by Resolution No. H-10788, adopted November 25, 1913, and filed in Minute Book 43 at page 262, described as follows:

## PARCEL 1

BEGINNING at the intersection of the general northern right of way line of County Road No. 556, known as Whipple Road, 49.50 feet in width, with the general northerly boundary line of said Water District; thence northwesterly and southwesterly along said general northerly boundary line of said Water District to an angle point therein; thence leaving said general northerly boundary line and continuing southwesterly and southerly along the easterly right of way line of County Road No. 314, known as Industrial Parkway Southwest, formerly Alquire Road, 45.00 feet in width, to said general northern right of way line of Whipple Road, being the general southerly boundary line of the territory annexed to the City of Hayward by Hayward City Council Ordinance No. 128 C.S., a map of which territory was filed January 15, 1958, in Map Book 40, at page 18A, Records of Alameda County, California, thence easterly, northerly, easterly, northerly, southeasterly and easterly along said boundary line to the point of beginning.

BEING a portion of the said territory annexed, and containing 920 acres, more or less.

## PARCEL 2

BEGINNING at the southeasterly corner of the territory annexed to the City of Hayward by Alameda County Board of Supervisors Resolution No. 108873 (recorded as Resolution No.108877), a map of which territory was filed October 1, 1964, in Map Book 43, at Page 69A, Records of Alameda County, California. thence northwesterly along the general easterly boundary line of said territory annexed, to the intersection thereof with the general northerly boundary line of said Water District; thence westerly along said general northerly boundary line to the intersection thereof with the northerly prolongation of that course designated "South 22° 04 East", in the general westerly boundary line of that territory annexed to the City of Hayward by Hayward City Council Ordinance No. 127 C.S., a map of which territory was filed January 15, 1958, in Map Book 40, at Page 17A, Records of Alameda County, California; thence leaving the said Boundary line of said Water District southeasterly along the said prolongation and general westerly boundary line to the most southwestern corner of said territory annexed; thence easterly, northerly, easterly, southerly, southeasterly and easterly along the general southerly boundary line of said territory annexed, to the most eastern corner thereof, said point being the most southern corner of the territory annexed to the City of Hayward by Hayward City Council Resolution No. 70-124 C.S., a map of which territory was filed June 18, 1970, in Map Book 60, at Page 64, Records of Alameda County, California; thence northeasterly along the general southerly boundary line of last said territory annexed to a point on the southwesterly boundary line of the territory annexed to the City of Hayward by Hayward City Council Ordinance No. 152 C.S., a map of which territory was filed June 13, 1958, in Map Book 40 at Page 30A, Records of Alameda County, California; thence southeasterly along the said southwesterly boundary line and along the southwesterly boundary line of the territory annexed to the City of Hayward by Hayward City Council Resolution No. 69-025 C.S., a map of which territory was filed February 24, 1969, in Map Book 60, Page 10, Records of Alameda County, California, to the most southern corner of the last said territory annexed; thence northeasterly and easterly along the general southerly boundary line of said territory annexed and along the general southerly boundary line of the aforementioned territory annexed by Hayward City Council Ordinance No. 152 C.S., to a point on the general westerly boundary line of the first said territory annexed (Resolution No. 108873), thence southeasterly along the said general westerly boundary line to the southwestern corner of said territory annexed, thence easterly along the general southerly boundary line of said territory annexed to the point of beginning.

BEING portions of the above mentioned territories annexed, and containing 202.3 acres, more or less.

PARCEL 3

BEGINNING at the southwestern corner of the territory annexed to the City of Hayward by Hayward City Council Resolution No. 67-291 C.S., a map of which territory was filed September 22, 1967, in Map Book 51, at Page 71, Records of Alameda County, California, thence northerly along the westerly boundary line of said territory annexed to the intersection thereof with the general northerly boundary line of said Water District; thence easterly along said general northerly boundary line to the intersection thereof with the general southerly boundary line of the territory annexed to the City of Hayward by Hayward City Council Ordinance No. 109 C.S., a map of which territory was filed October 8, 1957, in Map Book 40, at Page 9A, Records of Alameda County, California; thence westerly along the said southerly boundary line of said territory annexed to the intersection thereof with the easterly boundary line of the first said territory annexed; thence southerly and westerly along the easterly and southerly boundary lines thereof to the point of beginning.

BEING portions of the said territories annexed, and containing 10 acres, more or less.

PARCEL 4

BEGINNING at an intersection of the general northerly boundary line of said Water District, with the general westerly boundary line of the territory annexed to the City of Hayward by Hayward City Council Resolution No. 70-277 C.S., a map of which territory was filed December 24, 1970, in Map Book 60, at Page 77, Records of Alameda County, California; thence northwesterly along the last said boundary line to the intersection thereof with the aforesaid general northerly boundary line of said Water District, thence southeasterly and southerly along last said boundary line to the point of beginning.

BEING a portion of the said territory annexed, and containing 1.2 acres, more or less.

PARCEL 5

BEGINNING at an intersection of the general northerly boundary line of said Water District, with the general southerly boundary line of the territory annexed to the City of Hayward by Hayward City Council Ordinance No. 272 C.S., a map of which territory was filed March 22, 1960, in Map Book 40, at Page 90A, Records of Alameda County, California; thence westerly, northwesterly, and northerly along the last said boundary line to the intersection thereof with the aforesaid general northerly boundary line of said Water District; thence southeasterly along last said boundary line to the point of beginning.

BEING a portion of the said territory annexed and containing 1 acre, more or less.

PARCEL 6

BEGINNING at the most southern corner of the territory annexed to the City of Hayward by Hayward City Council Resolution No. 69-352 C.S., a map of which territory was filed December 29, 1969, in Map Book 60 at Page 49, Records of Alameda County, California; thence

northwesterly and northerly along the general westerly boundary line of said territory annexed to the intersection thereof with the general northerly boundary line of said Water District; thence easterly and southeasterly along said general northerly boundary line to the intersection thereof with the southeasterly boundary line of the aforesaid territory annexed; thence southwesterly along the last said boundary line to the point of beginning.

BEING a portion of the aforesaid territory annexed, and containing 215 acres, more or less.

PARCEL 7

BEGINNING at an intersection of the general northerly boundary line of said Water District, with the general easterly boundary line of the territory annexed to the City of Hayward by Hayward City Council Ordinance No. 187 C.S., a map of which along the first said boundary line to the intersection thereof with the said general easterly boundary line of the territory annexed; thence easterly, northerly and easterly along the last territory was filed October 15, 1958, in Map Book 40, at Page 49A, Records of Alameda County, California; thence northerly, westerly, southerly, southwesterly and southeasterly said boundary line to the point of beginning.

BEING a portion of the aforesaid territory annexed, and containing 92 acres, more or less.

SEC. 5-4.52 WELL WATER REPLENISHMENT CHARGES APPLICABLE TO THE AREA DETACHED IN 1973. From and after the effective date of detachment from the Alameda County Water District, there shall be imposed upon the owner of the land within the Detached Area by the City of Hayward (Water Department) for the benefit of the Alameda County Water District, the following charges.

- (1) Well Connection Fee. At the time a well is constructed or placed in operation, a well connection fee equivalent to the then-current assessed value of the parcel of land on which said well is located, multiplied by the number of years since detachment, not to exceed 10, multiplied by the average Alameda County Water District tax rate for said years.
- (2) a. Replenishment Assessment. Alameda County Water District Replenishment Assessment Adopted by Reference. The replenishment assessments (together with the administrative procedures therefor) adopted by the Alameda County Water District by Resolution No. 72-053, dated April 26, 1972, and entitled "Resolution No. 72-053 of Board of Directors of Alameda County Water District Levying a Replenishment Assessment on the Production of Ground Water, Fixing Rates per Acre Foot of Ground Water so Produced, Setting the Amount of Replenishment Assessment on Water Producing Facilities Having a Discharge Opening no Greater than Two Inches, and Providing Notice to Operators of Rate of Replenishment Assessment and Registration Form", and any subsequent resolutions adopted pursuant to Sec. 5-4.55, are hereby adopted as the replenishment assessments (and procedures) of the City of Hayward applicable to the Detached Area.

Three printed copies of said Alameda County Water District resolution and of Chapter 1942, Statutes of 1961 of the State Legislature, as amended, are on file in the office of the City Clerk, to which reference is hereby made for further particulars.

This charge shall apply to both private and public wells and shall continue as long as said well or wells continue in operation.

- b. Alameda County Water District Property Tax. A sum equivalent to the Alameda County Water District Property Tax as applied to said parcel of land within the detached area. This charge shall continue until such time as the well or wells are abandoned and sealed.

SEC. 5-4.53 WELL WATER REPLENISHMENT CHARGES APPLICABLE TO THE AREAS DETACHED IN 2000 and 2004. Pursuant to the conditions imposed by LAFCO's resolution 99-08 approving the detachment of the "Oliver East" property (hereafter described in Appendix "A") and pursuant to the conditions imposed by LAFCO's resolution 2004-27 and after the respective detachments of the Oliver West and Eden Shores properties from the Alameda County Water District ("District"), the City of Hayward shall impose the following charges for the benefit of the District upon any owner of land within the detached areas whenever a well is constructed or operated by any person or organization except an agency of the United States, the State of California, a municipal corporation, or other local government agency:

- a. Well Connection Fee. At the time a well is constructed or placed in operation, a Well Connection Fee equivalent to the taxes that would have been received by the District from the parcel of land on which said well is constructed or operated if the land had not been detached. The Well Connection Fee may be imposed for the years since the detachment up to a maximum of ten (10) years.
- b. Facilities Acreage Charge. A Facilities Acreage Charge based on the area served by the well in an amount equivalent to that which would be applicable to a similar well located within the District.
- c. Well User's Charge. The City shall continue to impose, subject to compliance with applicable provisions of law, a Well User's Charge equivalent to both of the following:
  - (i) Any replenishment assessment (commonly known as a pump tax) in the same amount as the assessment imposed by the District on wells located within the District's boundaries at the rate for uses other than municipal recreation or agriculture. This charge shall apply to all wells, including those constructed and operated by a governmental agency and shall continue as long as such wells are being operated: and
  - (ii) The District property tax which would have been applicable to such parcel of land on which the operating well is located is such land had remained within the District's jurisdiction. This charge shall continue until such time as the well is abandoned or sealed.
- d. The City may agree to have the Alameda County Water District collect the fees and

charges imposed under this Section.

SEC. 5-4.54 CONSTRUCTION, OPERATION, OR DESTRUCTION OF WELLS.

No well shall be constructed, operated, or destroyed within any detached area without the prior approval of the District. Subsequent to the adoption of this section, all tentative maps and/or subdivisions approved for property located in the detached area shall contain a condition that requires prior approval of the District before constructing, operating, or destroying a well in the detached area.

SEC. 5-4.55 AMENDMENTS TO REPLENISHMENT ASSESSMENT.

All amendments to or replacements of any replenishment assessment (pump tax) by the Alameda County Water District enacted subsequent to the effective date of detachment which are not inconsistent with these regulations shall automatically become a part of these regulations upon the filing of three certified copies thereof with the City Clerk of City.

## **APPENDIX A TO HAYWARD MUNICIPAL CODE CHAPTER 5-4: DESCRIPTION OF "OLIVER EAST" AREA DETACHED IN 2000**

The following real property located within the City of Hayward, County of Alameda, State of California, formerly lying within the boundaries of the Alameda County Water District as said boundaries were established by the Board of Supervisors of Alameda County by Resolution No. H-1 0788, adopted November 25, 1913, and filed in Minute Book 43 at page 262, is the area known as the "Oliver East" property, detached from the Alameda County Water District in 2000. Such area is more particularly described as follows:

### **OLIVER EAST PROPERTY**

All that certain real property situated in Eden Township, in the unincorporated area of Alameda County, California, described as follows:

Beginning at an angle point in the General Southern Boundary line of the territory annexed to the City of Hayward by Ordinance No.127 C.S., the Map of which was filed for record on January 15, 1958 in Book 40 of Maps at page 17A, Official Records of Alameda County, California, said point of beginning being at the Westerly terminus of a line shown as having a length of 2,536.05 feet, and said point of beginning also being the intersection of the Westerly prolongation of the Southern boundary line of Parcel Map 6191, which was filed for record on July 2, 1992 in Book 202 of Parcel Maps at Pages 3 through 6, Official Records of Alameda County, with the Northeasterly right-of-way line of the lands of the Southern Pacific Transportation Company (formerly Southern Pacific Railroad, and also formerly South Pacific Coast Railroad); thence Southeasterly along said Northeasterly line, being also along the Northeasterly line of the territory annexed to the City of Hayward by Ordinance 140 C.S., the Map of which was filed for record on April 14, 1958 in Book 40 of Maps at Page 23A to the General Northern boundary line of the City of Union City, as established at the time of incorporation by Alameda County Board of Supervisors Resolution No.89527, Adopted on January 19, 1959; thence Easterly and Northeasterly along said General Northern boundary line, to the Northeastern right-of-way line of Hesperian Boulevard, (66.00 feet wide), also known as County Road No.90, also being the General Westerly boundary line of the territory detached from the City of Union City and annexed to the City of Hayward by Resolution No.69-025 C.S., a Map of which was filed for record on February 24, 1969 in Book 60 of Maps at Page 10, Official Records of Alameda County, California; thence Northeasterly along said General Westerly boundary line, to the Southwesterly corner of the territory annexed to the City of Hayward by Ordinance No.152 C.S., a Map of which was filed for record on June 13, 1958 in Book 40 of Maps at Page 30A, Official Records of Alameda County, California; thence continuing along said Northeasterly right-of-way line of Hesperian Boulevard also being along the General Westerly line of said annexed territory (Ord. No.152 C.S.) To the Easterly prolongation of the Southern boundary line of said territory annexed to the City of Hayward by Ordinance 127 C.S., also being the Easterly prolongation of the Southern boundary line of Parcel Map No.6191, which was filed for record on July 21, 1992 in Book 202 of Maps at Pages 3 through 6, Official Records of Alameda County, California; thence Westerly along said prolongations, and along said Southern Boundary lines to the point of beginning.

Containing 119 acres, more or less.

## **Appendix D**

### **Figures**

Prepared by

Michael A. Myers, Wall Observer Support Team

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Prepared by

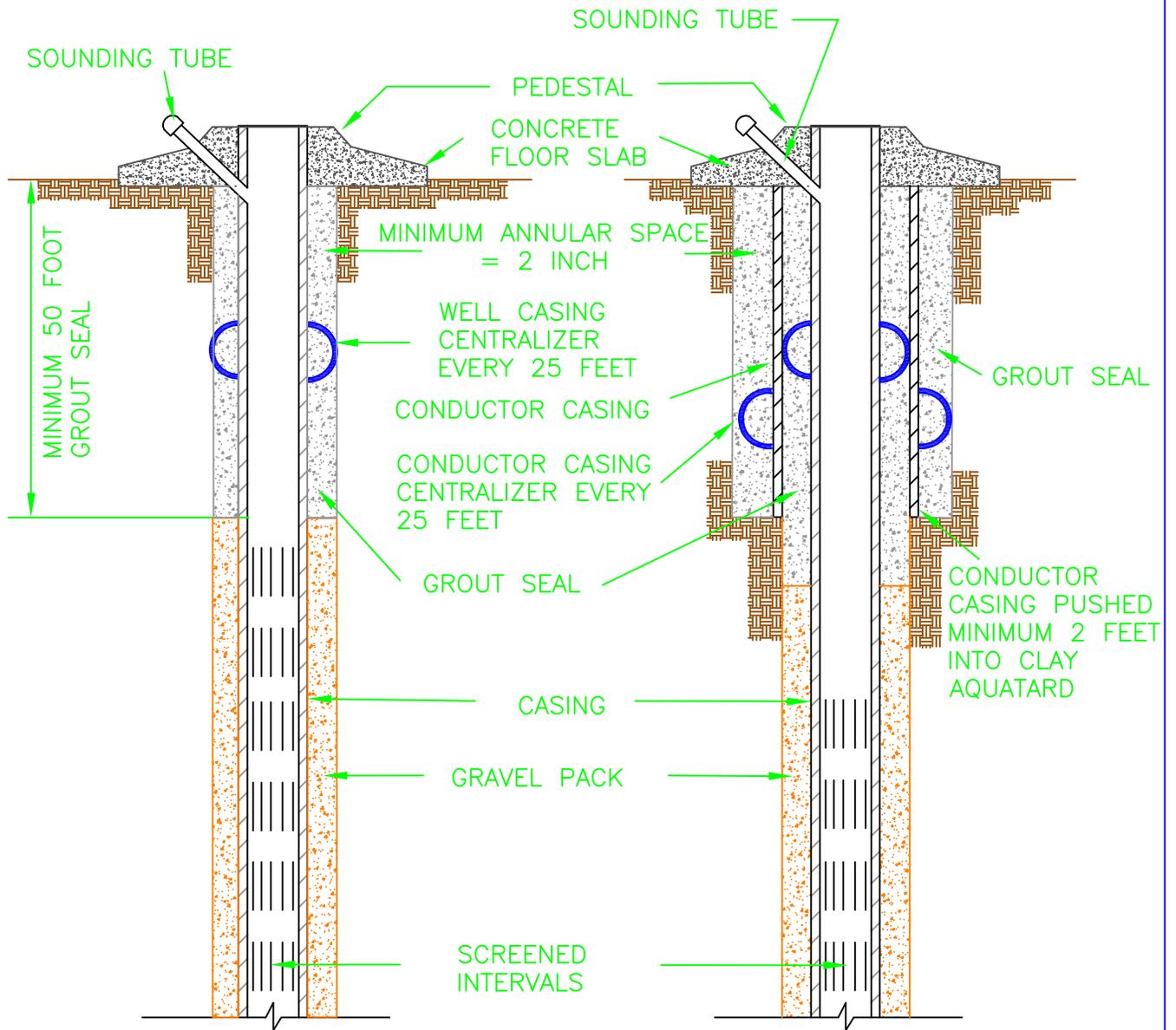
Michael A. Myers, Wall Observer Support Team

Prepared by

Michael A. Myers, Wall Observer Support Team

Prepared by

Michael A. Myers, Wall Observer Support Team



WITHOUT CONDUCTOR CASING

WITH CONDUCTOR CASING



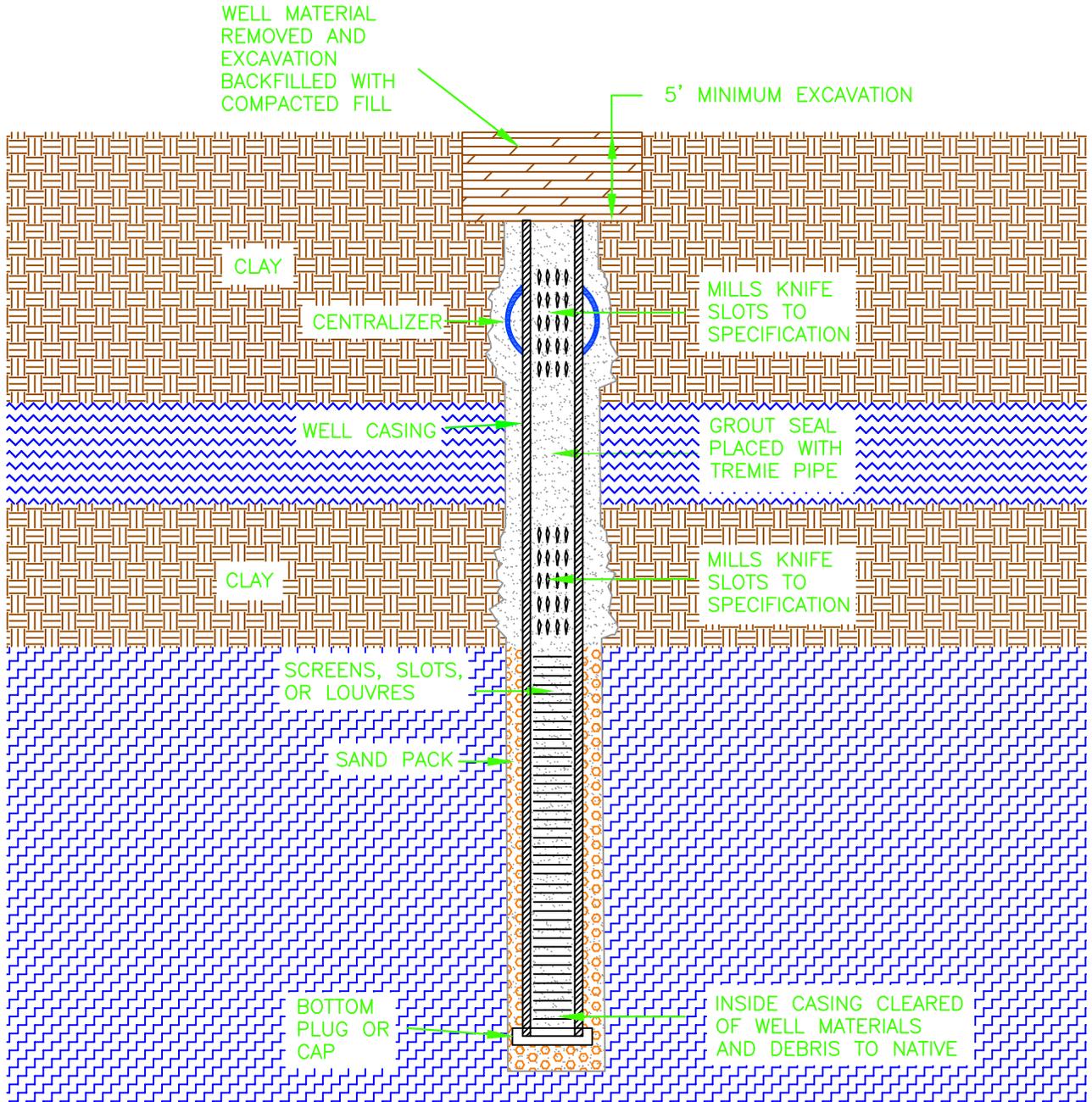
ALAMEDA COUNTY WATER DISTRICT  
 43885 SOUTH GRIMMER BOULEVARD  
 P.O. BOX 5110  
 FREMONT, CA 94537-5110  
 (510) 668-4200

## TYPICAL WATER WELL CONSTRUCTION

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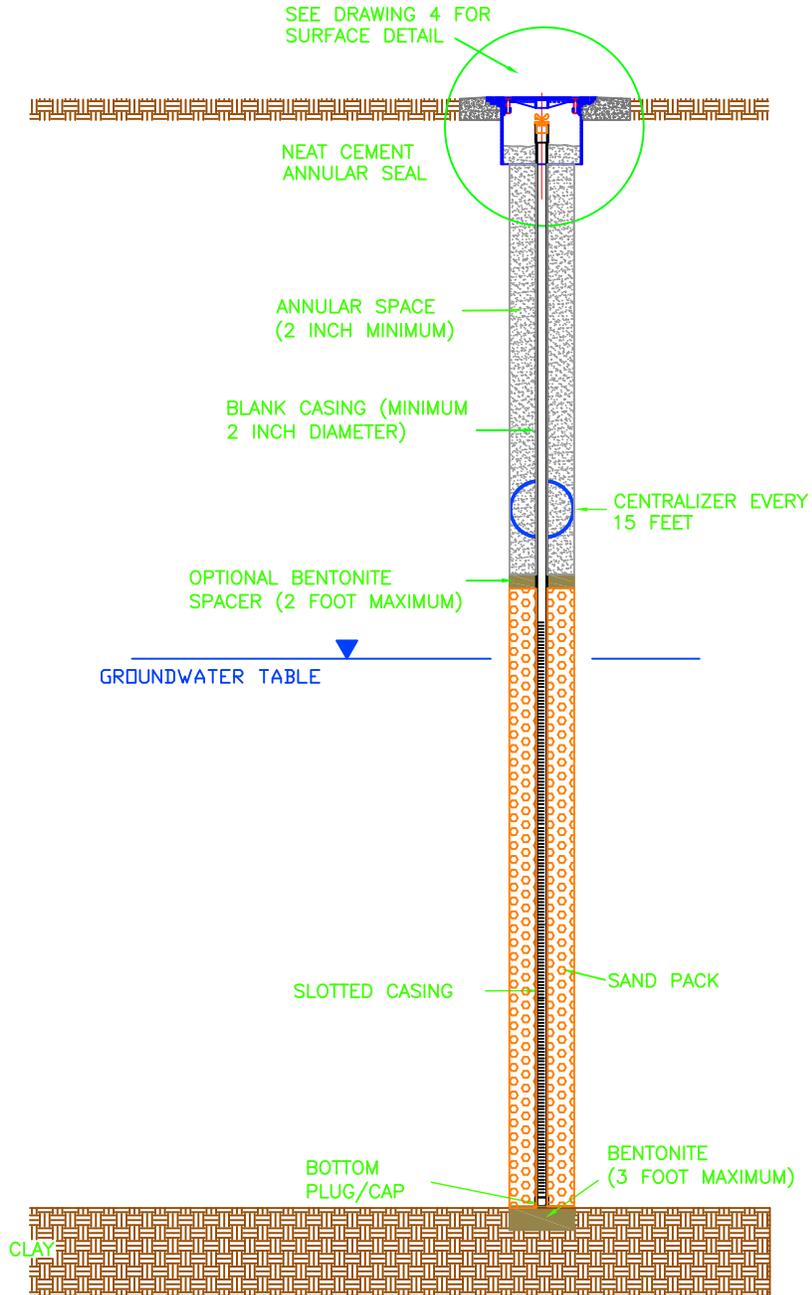


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## TYPICAL WATER WELL DESTRUCTION STEEL CASED WELLS

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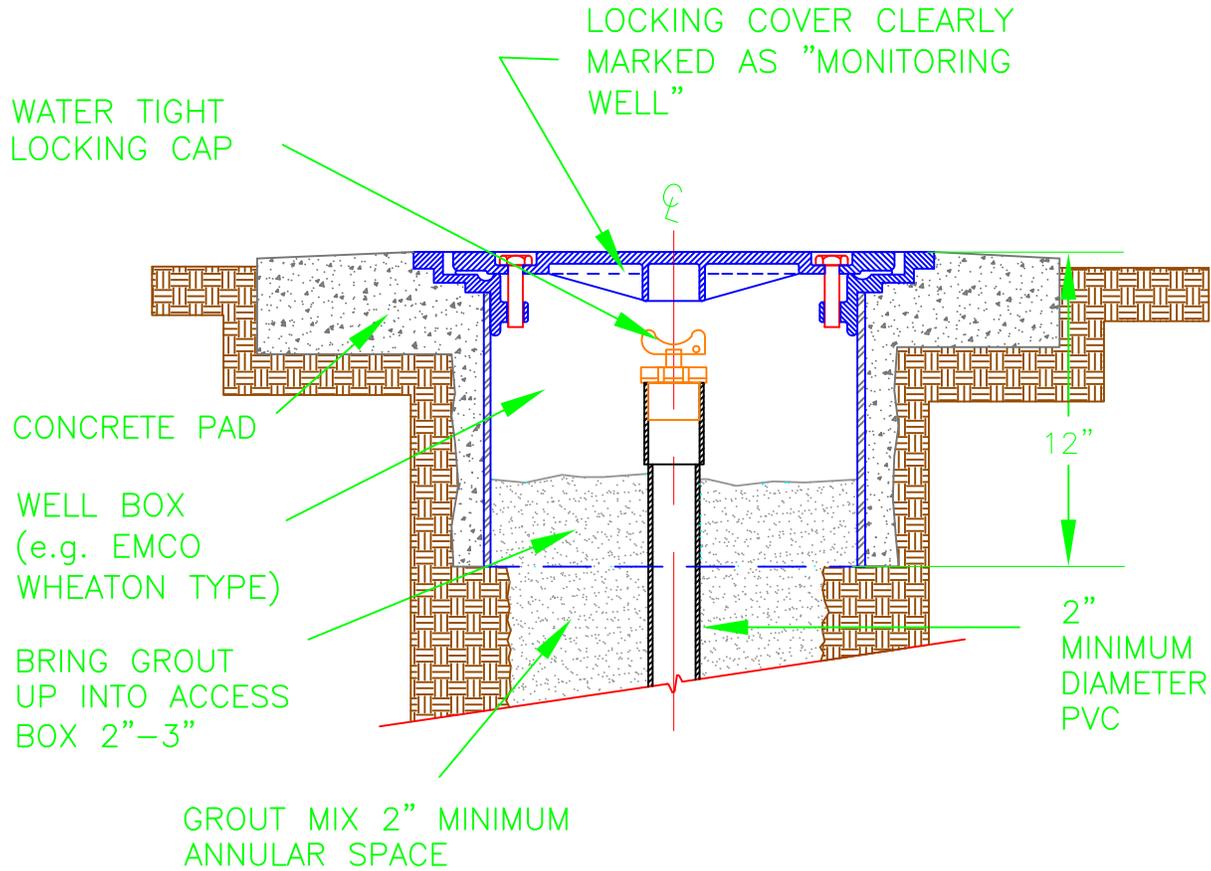
ALAMEDA COUNTY WATER DISTRICT  
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 FREMONT, CA 94537-5110  
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### TYPICAL MONITORING WELL CONSTRUCTION

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### TYPICAL FLUSH MOUNTED WELL BOX INSTALLATION

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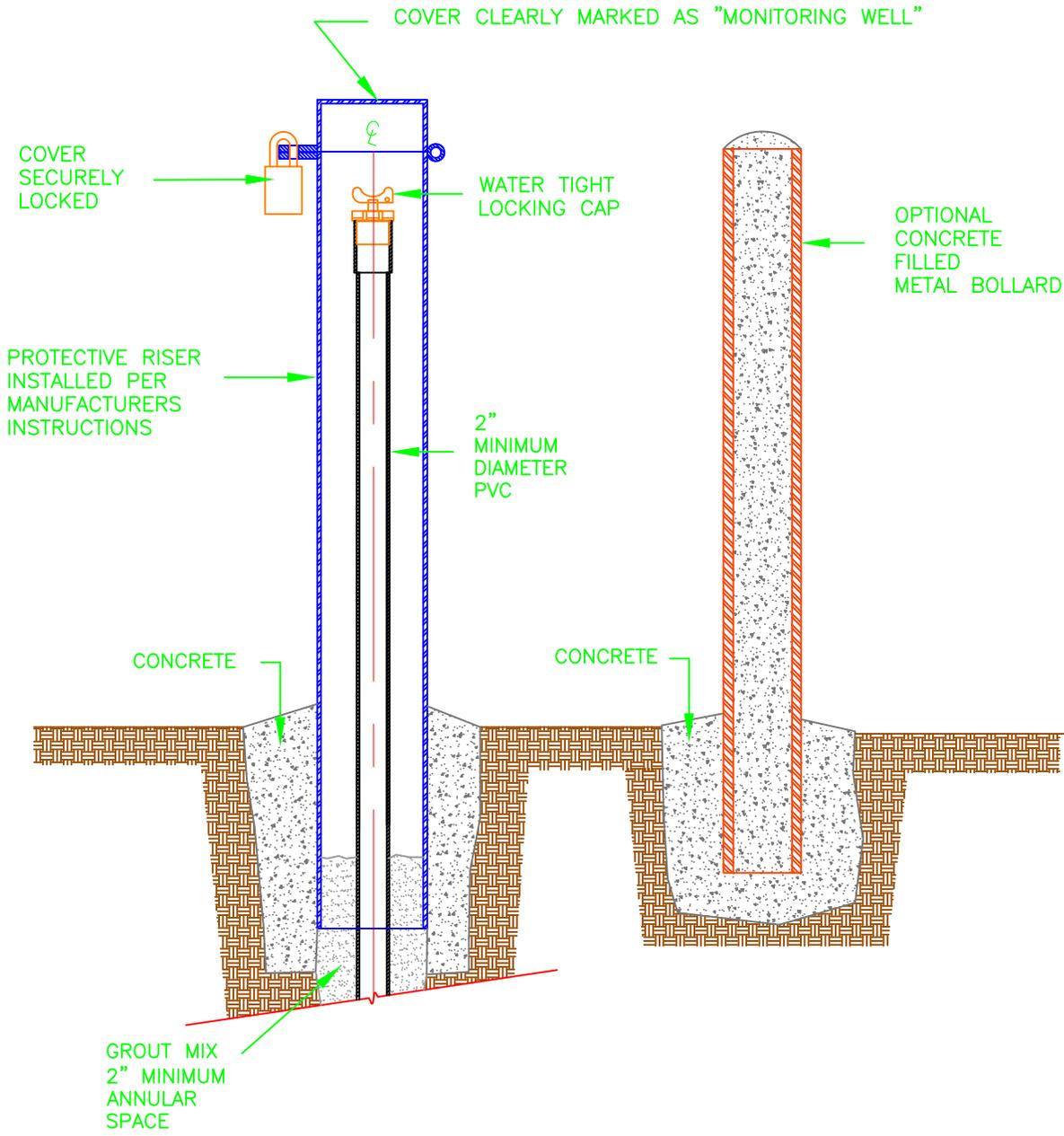
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FIGURE NUMBER

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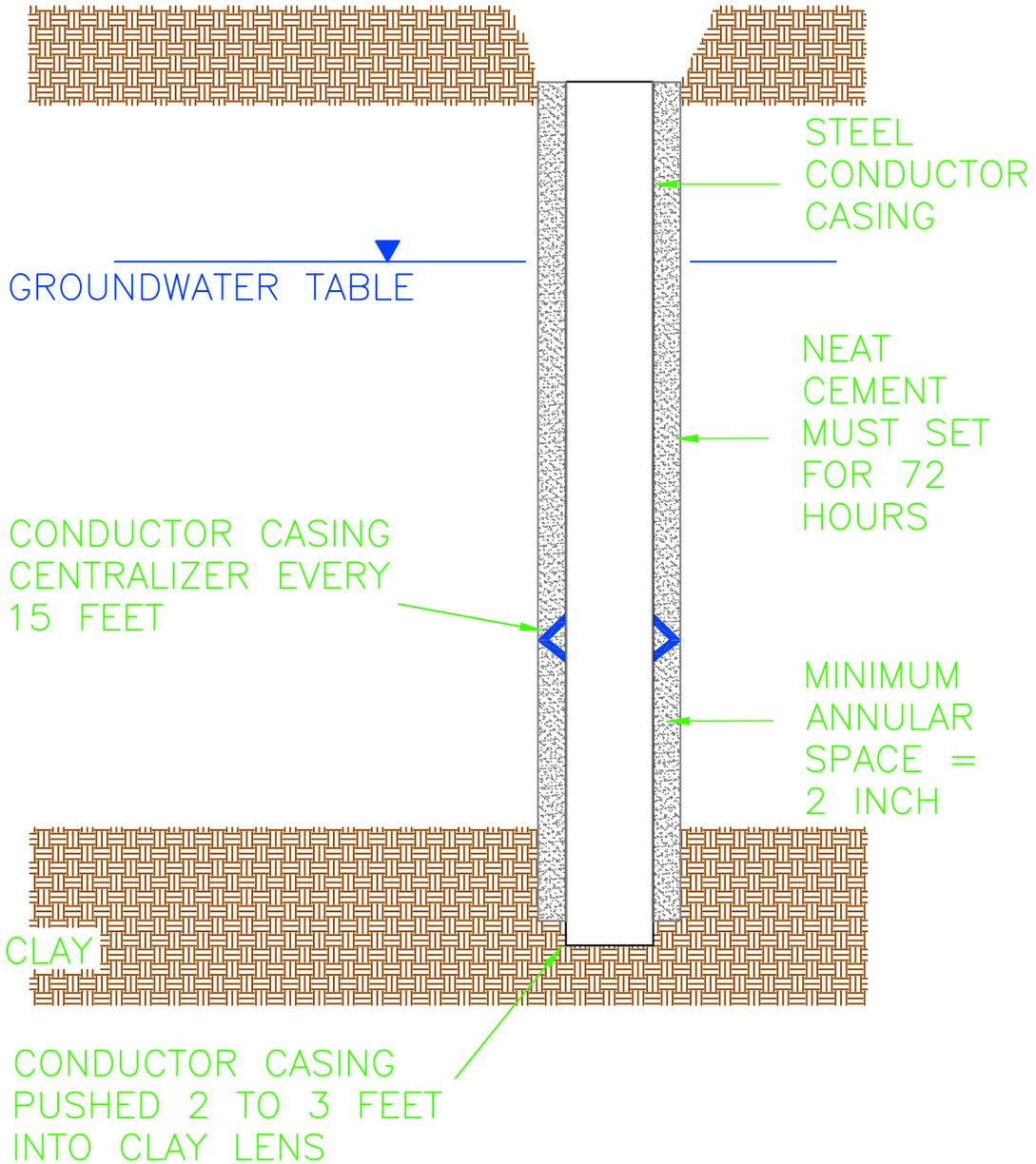
**TYPICAL PROTECTIVE RISER  
 INSTALLATION**

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# STEP 1



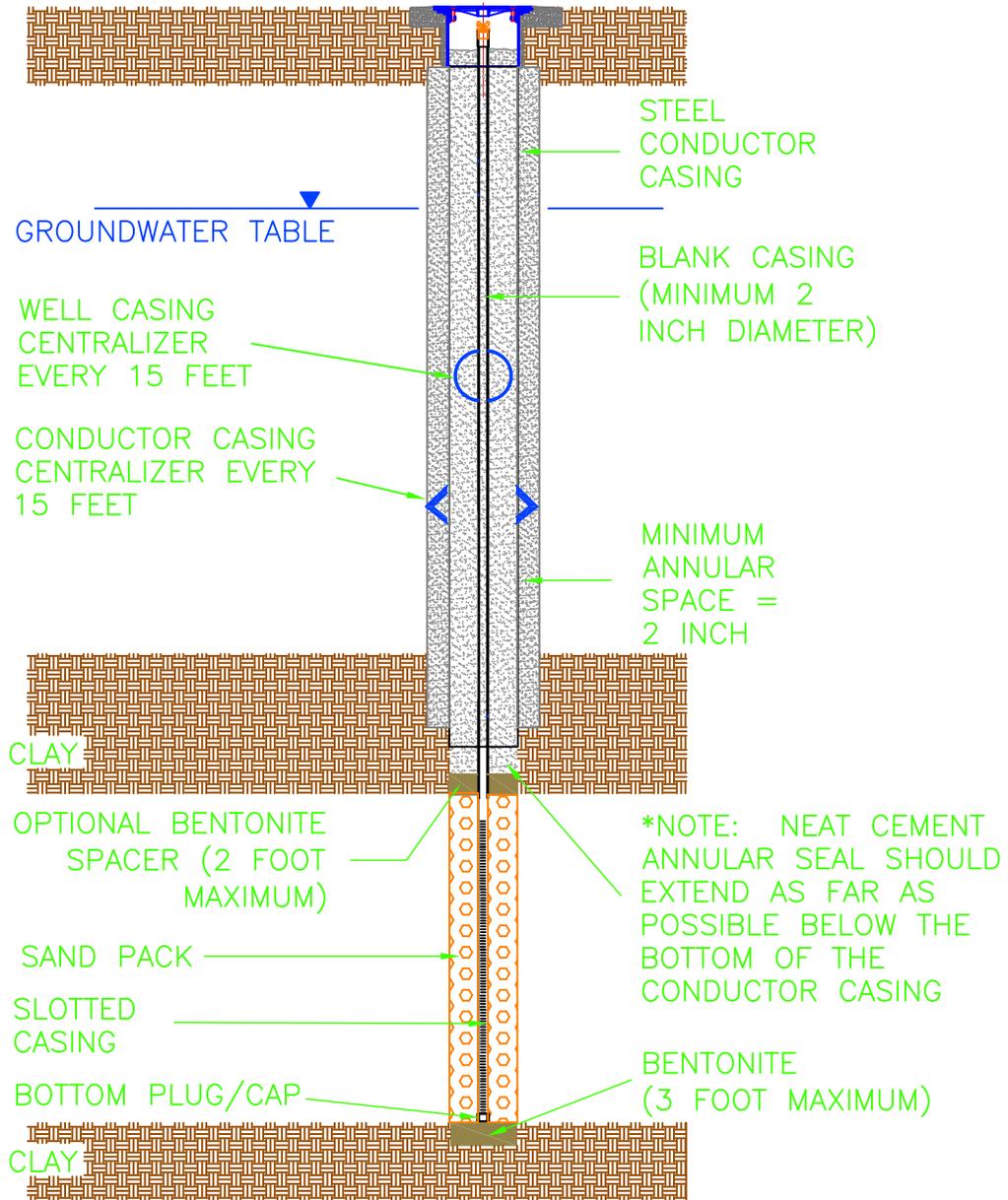
ALAMEDA COUNTY WATER DISTRICT  
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## TYPICAL MONITORING WELL CONSTRUCTION WITH CONDUCTOR CASING STEP 1

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# STEP 2



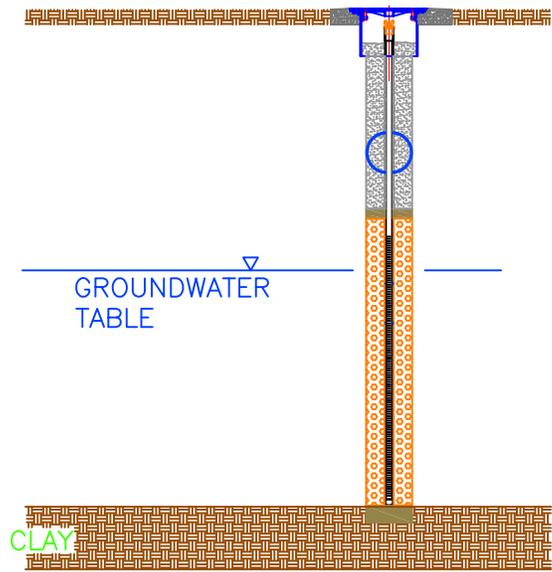
ALAMEDA COUNTY WATER DISTRICT  
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## TYPICAL MONITORING WELL CONSTRUCTION WITH CONDUCTOR CASING STEP 2

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			2 OF 2

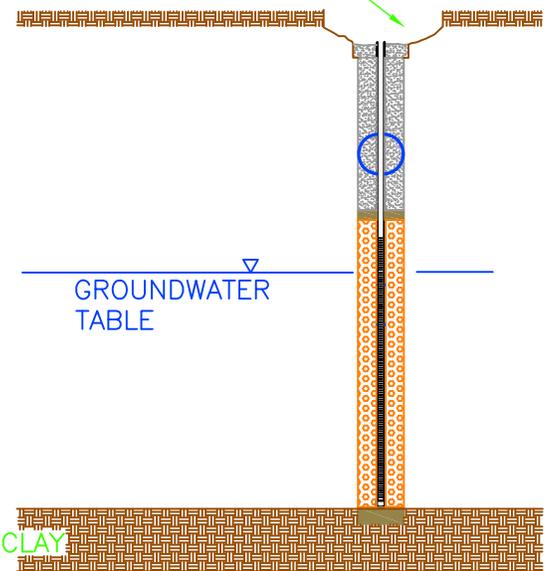
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TYPICAL  
MONITORING  
WELL



STEP 1

REMOVE ACCESS BOX OR  
VAULT



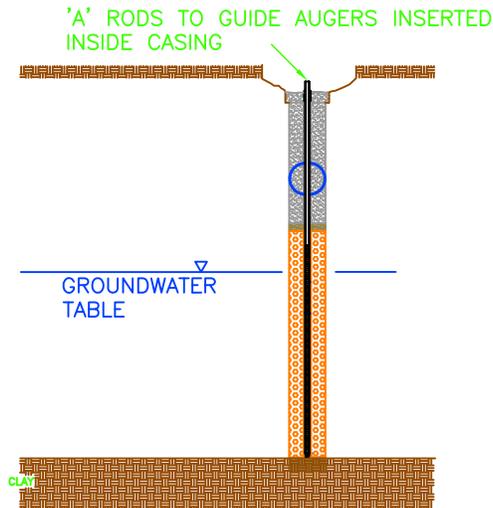
ALAMEDA COUNTY WATER DISTRICT  
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TYPICAL MONITORING WELL  
DESTRUCTION BY AUGER  
STEP 1

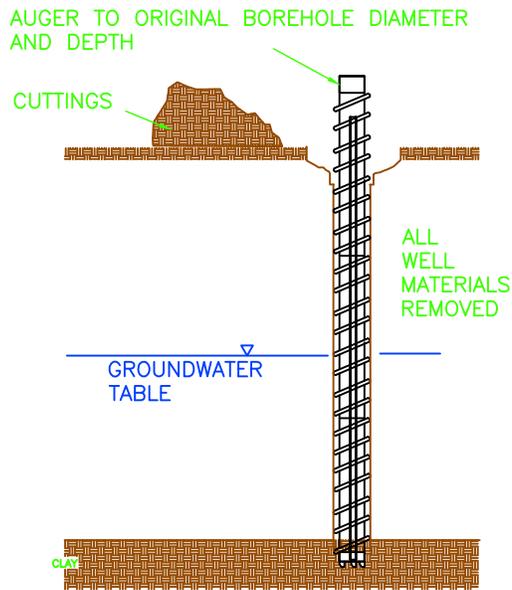
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**STEP 2**



**STEP 3**



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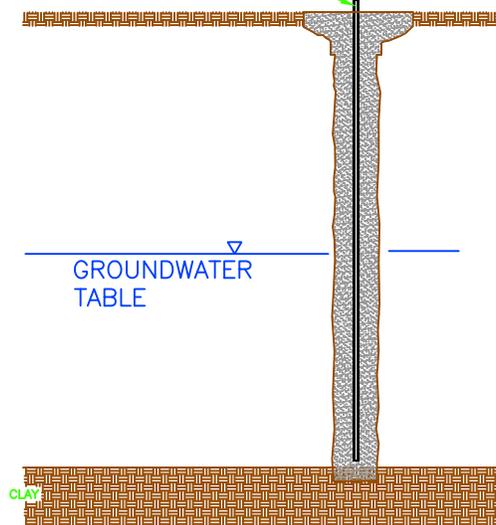
**TYPICAL MONITORING WELL  
 DESTRUCTION BY AUGER  
 STEPS 2 & 3**

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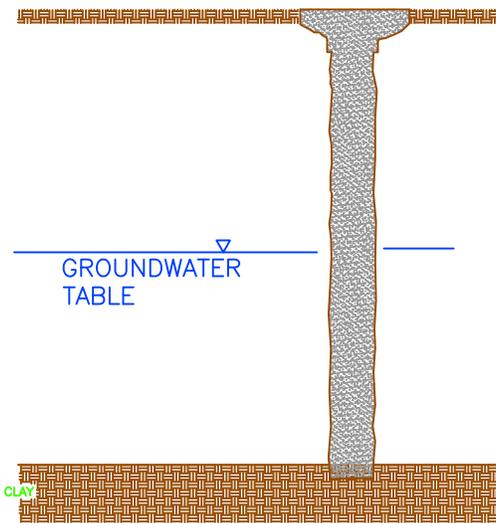
### STEP 4

TREMIE PIPE INSERTED AND GROUT PLACED FROM BOTTOM TO SURFACE



### STEP 5

WELL DESTRUCTION COMPLETE

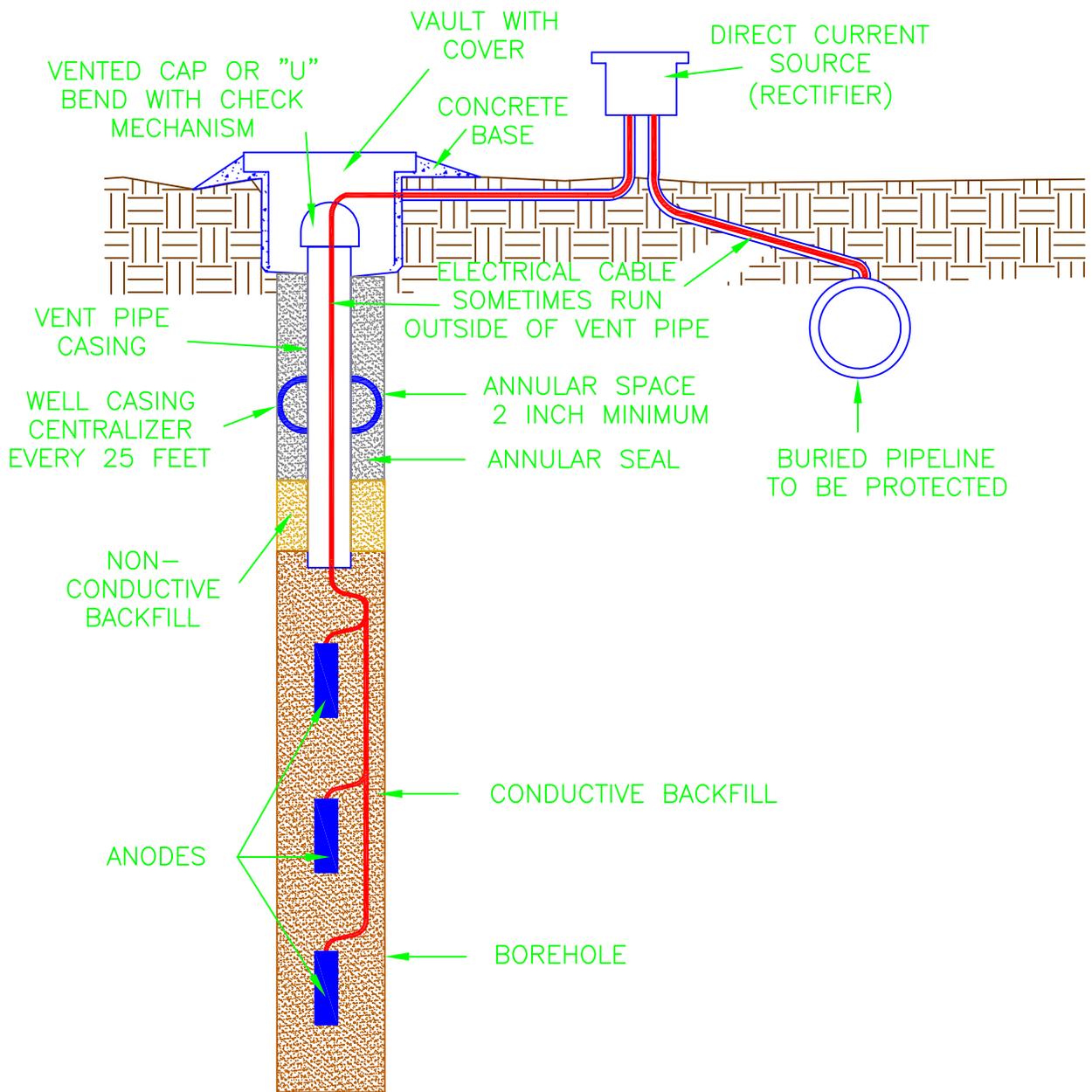


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## TYPICAL MONITORING WELL DESTRUCTION BY AUGER STEPS 4 & 5

DRAWN BY:	LM	DATE	12/15/2010
SCALE:	NONE	FIGURE NUMBER	SHEET
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### TYPICAL CATHODIC PROTECTION WELL CONSTRUCTION

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**8**

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