ALAMEDA COUNTY WATER DISTRICT

GROUNDWATER MANAGEMENT POLICY

(Adopted January 26, 1989)
(Amended March 22, 2001)

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ADOPTED JANUARY 26, 1989
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BACKGROUND

The Alameda County Water District (ACWD) was created by a vote of area residents in December 1913, thereby becoming the first water district in California to be formed under the County Water District Act enacted earlier that year. It is governed by a five-member board of directors, elected at large.

In the years preceding the vote, local farmers and residents had become concerned about water companies and agencies exporting water from both Alameda Creek and local groundwater to nearby communities such as Oakland and San Francisco. The result of these exports was that the groundwater table was falling at a rapid rate. The voters hoped, in establishing ACWD, to regain control over local water supplies, to protect the underground water in the Niles Cone Groundwater Basin, and to conserve the waters of Alameda Creek.

ACWD now has several sources of supply, including water purchased from the State Water Project (via the South Bay Aqueduct) and the San Francisco Public Utilities Commission (via the Hetch Hetchy aqueduct system). But groundwater remains an important component of its supply, currently furnishing 35% of the water ACWD distributes. In dry years, groundwater has contributed over 60% of the supply. Thus, conservation and preservation of the groundwater basin continues to be a vitally important program for ACWD.

AUTHORIZATION

This Groundwater Management Policy is based on the statutory authority granted to ACWD under the County Water District Law (commencing with Section 30000 of the Water Code); the Replenishment Assessment Act of the Alameda County Water District (Section 4, Chapter 1942

of the Statutes of 1961, as amended in 1970 and 1973), which grants additional powers to ACWD to prevent pollution, contamination, or diminution in quality of the groundwater supply; local well ordinances (Fremont No. 950, as amended; Newark No. 136; and Union City No. 109-73); agreements with other agencies; and local hazardous materials ordinances.

POLICY STATEMENT

It is the policy of the Alameda County Water District to efficiently protect and manage the Niles Cone Groundwater Basin to ensure a reliable supply of high quality water that satisfies present and future municipal, industrial, recreational, and agricultural water needs in the ACWD service area. ACWD will develop and implement appropriate programs within the ACWD service area to protect and manage the groundwater basin as a long-term source of water supply for ACWD. ACWD will also actively protect the groundwater basin from activities outside the ACWD service area that may negatively impact the water quality and/or water supply of the basin.

OBJECTIVES

The purpose of this policy is to protect and improve ACWD's groundwater resources for the benefit of both ACWD's customers and private well owners by taking actions designed to meet the following objectives:

- Increase groundwater replenishment capability.
- Increase the usable storage capacity of the groundwater basin.
- Operate the basin to provide: (1) a reliable water supply to meet baseload and peak distribution system demands, (2) an emergency source of supply, and (3) reserve storage to augment dry year supplies.
- Protect groundwater quality from degradation from any and all sources including: saline

water intrusion, wastewater discharges, recycled water use, urban and agricultural runoff, or chemical contamination.

- Improve groundwater quality by (1) removing salts and other contaminants from affected areas of the basin, and (2) improving the water quality of source water used for groundwater recharge.

The specific groundwater management programs that have been developed and implemented by ACWD to achieve these policy objectives are listed in Table 1and are described in greater detail in Attachment 1 to this Policy.

This Policy is intended to serve as a guide to ACWD management in the continued development and implementation of programs to manage and protect ACWD water resources and as a nontechnical document to explain ACWD groundwater programs to members of the public. This Policy is not intended to create legal rights in any person or organization, or to impose legal obligations on ACWD. It may be amended or repealed by the Board of Directors at any time.

TABLE 1 - SUMMARY OF ACWD GROUNDWATER MANAGEMENT PROGRAMS

Groundwater Program	Description
Water Supply Management	Planning, managing, and optimizing ACWD's sources of supply: watershed runoff, SWP water for recharge, SWP water for treatment, SFPUC water for blending, and water banking.
Groundwater Replenishment	Operation of ACWD groundwater recharge facilities to optimize 1) capture of local runoff, 2) replacement of water extracted from production and ARP wells, and 3) maintenance of groundwater levels to prevent salt water intrusion.
Watershed Protection and Monitoring	Assisting in the protection and monitoring of the watershed to optimize the quality of runoff water available for ACWD water supply.
Basin Monitoring	Sampling and measuring wells to assess and evaluate 1) groundwater quality, 2) water pressures within the basin, and 3) the direction of groundwater flow.
Wellhead Protection Program	Identify sensitive recharge and groundwater areas, maintain an inventory of potential threats within these areas, assess the vulnerability of source water, and develop management strategies to minimize the potential for groundwater quality impacts.
Aquifer Reclamation Program	Pump brackish water from degraded aquifers in order to 1) increase useable basin storage, 2) improve overall water quality, 3) prevent movement of brackish water toward ACWD production wells, and 4) provide (future) supply augmentation through treatment to potable water standards.
Groundwater Protection Program	Maintain an active role in 1) assisting with the identification of potential groundwater contamination, 2) implementing monitoring systems at hazardous materials storage sites, and 3) providing technical oversight for investigations and cleanups at hazardous materials spill sites.
Well Ordinance Administration	As enforcing agency for municipal ordinances governing construction, repair, or destruction of wells, ACWD provides inspection services, collects fees, and performs field searches for abandoned wells which could act as a conduit for contamination of groundwater.

ATTACHMENT 1

ACWD GROUNDWATER MANAGEMENT PROGRAMS

(March 22, 2001)

Eight major groundwater management programs have been developed and implemented by ACWD to achieve the objectives identified in ACWD's Groundwater Management Policy:

- Water Supply Management
- Groundwater Replenishment
- Watershed Protection and Monitoring
- Basin Monitoring
- Wellhead Protection Program
- Aquifer Reclamation Program
- Groundwater Protection Program
- Well Ordinance Administration

Water Supply Management

_____ACWD has three primary sources of water: (1) runoff from the Alameda Creek Watershed, (2) treated surface water purchased from the San Francisco Public Utilities Commission (SFPUC) and delivered through the Hetch Hetchy aqueduct system, and (3) untreated surface water purchased from the State Water Project (SWP) and delivered through the South Bay Aqueduct. Alameda Creek watershed runoff and imported water from the State Water Project are used for replenishment of the Niles Cone Groundwater Basin.

The groundwater basin is used conjunctively with surface water supplies. Generally, surface water production facilities are operated throughout the year to meet distribution system demands. Groundwater production facilities are operated to meet a portion of the base load demand and to meet peak and emergency demands. A desalination facility is planned to be operational in 2002 to treat some of the brackish groundwater currently being discharged to the San Francisco Bay from the Aquifer Reclamation Program wells (see Aquifer Reclamation Program section) and produce a new source of high quality water.

ACWD conducts an annual survey of groundwater conditions to determine the amount of imported water needed to maintain groundwater levels within an acceptable range and to determine a replenishment assessment rate. Groundwater levels are also used to trigger dry year water management response programs, including additional water conservation and utilization of off-site water banking and/or exchange programs.

Owners of wells who pump water from the groundwater basin are required to pay a replenishment assessment to reimburse ACWD for a portion of the cost of imported water used to recharge the depleted groundwater basin and to help offset ACWD's groundwater basin operations and management costs. Currently, the owners or operators of 234 wells receive annual registration forms as part of the replenishment assessment program.

Reclaimed wastewater is a potential alternative source of supply for ACWD. ACWD will cooperate with the Union Sanitary District to explore appropriate and beneficial uses of reclaimed wastewater within ACWD's service area in locations where there is very little risk of percolation into the aquifers used for potable water production.

Groundwater Replenishment

ACWD utilizes sections of the Alameda Creek Flood Control Channel behind three inflatable rubber dams and recharge ponds (abandoned quarry pits) to store and percolate

water into the aquifers of the Niles Cone Groundwater Basin. The groundwater replenishment program serves two major roles:

(1) Replenishment of groundwater extracted to meet local demands and to replace brackish water extracted as part of the Aquifer Reclamation Program.

(2) Maintenance of groundwater flow toward San Francisco Bay, in order to prevent future saline water intrusion from the bay and to displace brackish water remaining from historic saline water intrusion.

Through ACWD's long range Capital Improvement Program, a major portion of the recharge ponds below (i.e., west of) the Hayward Fault were rehabilitated in 1997 and 1998 and resulted in greater storage capacity within the ponds and increased the rate at which water is recharged to replace water pumped from the groundwater basin.

Recharge facilities are operated to maximize the capture of local runoff. The operating criteria for the recharge facilities and the groundwater basin are continuously evaluated to optimize the use of these resources.

Watershed Protection and Monitoring

ACWD plays a major role in coordinating and communicating with other state and local agencies to influence policy decisions related to activities within the watershed of Alameda Creek which could have a negative effect on ACWD water supplies and the groundwater basin. This includes review of environmental impact reports, technical evaluation of National Pollutant Discharge Elimination System (NPDES) permits, emergency response to surface spills, participation in watershed planning and technical committees, and participation in planning studies for expansion of wastewater export facilities in the Livermore-Amador Valley.

As part of ACWD's watershed protection program, ACWD will require (to the extent

ACWD has legal authority to do so) and in all cases will request that lead agencies for future development projects within the Upper Alameda Creek Watershed that may affect water quality in Alameda Creek determine the extent and significance of those impacts, and will request such lead agencies to require adequate mitigation of any significant impacts to Alameda Creek and ACWD. Specific mitigation measures will depend on the particular features of individual projects including their location, size, volume of water applied and/or discharged, and the physical/chemical/biological composition of such water. Mitigation may include either or both implementation of on-site source control measures or contributions to off-site mitigation projects, such as reimbursement of a portion of ACWD's cost of constructing and operating a demineralization facility. The goal of whatever mitigation measures are employed is to prevent individual project or cumulative effects of development (or other projects within the Alameda Creek Watershed) from adversely changing the quality of groundwater in the Niles Cone Groundwater Basin.

ACWD is working in coordination with other agencies to implement a watershed monitoring program consisting of sampling surface water, measuring water quality parameters, and estimating water flow rates at key locations in the watershed. ACWD also patrols Alameda Creek performing visual inspections and collecting samples for water quality analysis. ACWD has constructed and maintains an automated monitoring station located adjacent to Alameda Creek at the west end of Niles Canyon which provides continuous information and signals an alarm to ACWD when there are significant changes in water flow or quality that may affect the operation of ACWD's recharge facilities.

Basin Monitoring

The District performs weekly water level measurements of representative wells in each major aquifer to monitor changes in groundwater levels. A more comprehensive

monitoring program consisting of sampling and measuring water levels is performed in the spring and fall of each year to assess the groundwater quality, water pressures within the basin, and direction of groundwater flow. Production wells are monitored regularly for a wide variety of water quality parameters specified by state and federal regulations. The groundwater recharge area is monitored daily for water level fluctuations to track percolation rates and to schedule water imports.

Because of development, many privately owned water wells that ACWD has utilized in the past for monitoring basin water levels and saline water intrusion have been destroyed. Since these wells are critical to the management of ACWD's groundwater basin, replacement monitoring wells have been included in the Capital Improvement Program. From 1997 through 1999, 32 monitoring wells have been installed as part of the Monitoring Well Construction Project. A total of approximately 60 wells are expected to be installed by 2007 to provide additional geologic information, to replace destroyed wells, and to improve water sample and water level data acquisition through efficiently located and appropriately designed wells.

Wellhead Protection Program

The 1986 Amendments to the Safe Drinking Water Act require each state to establish a Wellhead Protection Program which "protects the wellhead areas of all public water systems from contaminants that may have adverse human health effects." California is relying on local agencies to plan and implement this program. ACWD has initiated the identification of surface and recharge areas vulnerable to contamination for the protection of ACWD's groundwater facilities. The program also includes the identification of potential contaminant sources, development of management practices to reduce the contamination risk, identification of areas to be monitored, and preparation of a contingency/emergency

response plan in the event of a contamination incident. As an example of a management practice, ACWD has worked with the City of Fremont to require a "Do Not Pollute" decal at each storm drain inlet within a development adjacent to the recharge facilities and has mailed a stormwater runoff public education brochure to all houses on streets with storm drains that discharge directly into a recharge pond.

The groundwater portion of the Source Water Assessment Program (SWAP) that is now being required by the California Department of Health Services (DHS) has a similar focus to that of the Wellhead Protection Program. SWAP requires the identification of sensitive surface water and groundwater areas, an inventory of potential threats within those areas, and an assessment of source vulnerability. The primary difference between the programs is that the Wellhead Protection Program additionally identifies management strategies to minimize the potential for groundwater quality impacts. Because of the overlap between these programs, development of the programs will be closely coordinated. Since DHS is requiring a SWAP for all new sources of water, a "pilot" SWAP is currently being prepared for Aquifer Reclamation Program wells that will serve as supply wells for ACWD's future desalination facility. This pilot SWAP will serve as a model for developing a SWAP for all ACWD facilities in the future.

Both of these programs are expected to benefit from the results of the American Water Works Association Research Foundation project being jointly conducted by ACWD and the Lawrence Livermore National Laboratory. The project, titled "Predicting Water Quality Changes from Artificial Recharge Sources to Nearby Wellfields," began in the spring of 1997 and is expected to be completed in 2001. The scope of work includes the characterization and evaluation of groundwater flowing between the percolation ponds and ACWD's production wells using isotopic tracers, age-dating techniques, and production and monitoring well sampling. A major objective of the study is determining groundwater and

chemical travel times within the fastest flow paths between the recharge facilities and the production wells.

ACWD's efforts in developing a Wellhead Protection Program and maintaining a strong public education program have been recognized as a Groundwater Guardian Affiliate by the Groundwater Foundation, a private non-profit educational organization that is dedicated to educating the public about the conservation and protection of groundwater. The Groundwater Guardian Affiliate designation is awarded to entities at the regional level that work to promote shared responsibility for groundwater protection.

Aquifer Reclamation Program

The goal of this program is to remove entrapped saline water from degraded portions of aquifers in the Niles Cone Groundwater Basin in order to increase usable basin storage, to improve overall water quality, and to prevent the movement of this saline water toward production wells. Pumped water from a combination of nine Aquifer Reclamation Program (ARP) wells is discharged to flood control channels in accordance with a NPDES permit issued by the Regional Water Quality Control Board. Operation of this program depends on the annual availability of water supplies to replace the water that is pumped out of the aquifers. In the future, some of the wells used in this program will be converted to supply water to the brackish groundwater desalination facility planned for Newark to supplement ACWD's drinking water supply.

Five other wells are being evaluated as possible additions to the Aquifer Reclamation Program. These wells are former Salinity Barrier Project wells. The Salinity Barrier Project (SBP) was initiated in the late 1970's by ACWD in cooperation with the Department of Water Resources. The plan was to install 14 extraction wells strategically located to create an alignment just inland of the salt evaporator ponds, running parallel

along the entire stretch of ACWD's shoreline. Simultaneous pumping of the wells would create a trough along the alignment to prevent inland migration of saline water originating from the bay and evaporator ponds during drought periods. In addition to preventing new sea water intrusion, SBP operation was planned as a potential augmentation of the Aquifer Reclamation Program during non-drought periods for mitigating historic sea water intrusion in the interior part of the basin. By the late 1980's, five of the fourteen wells were constructed. However, the project was postponed pending further evaluation.

In the course of comprehensive water supply and facilities planning in the 1990's, ACWD determined that operation of the basin below sea level during drought periods is no longer a necessary or desirable strategy relative to other water supply options that have since become available to ACWD. Because the basin is not likely to be operated significantly below sea level during drought periods, SBP is not needed to prevent new sea water intrusion. Although ACWD's groundwater basin strategy no longer includes a salt water barrier, groundwater modeling indicates that pumping these wells may help to improve water quality in the inland portions of the groundwater basin (which is the goal of the Aquifer Reclamation Program), especially if they are pumped during wet periods with high piezometric head. More groundwater modeling work is needed to determine whether their contribution to water quality improvement would justify their activation.

Groundwater Protection Program

ACWD takes an active role in (1) assisting regulatory agencies and industry in identifying sources of potential groundwater contamination, (2) implementing monitoring systems at hazardous materials storage sites, and (3) providing technical oversight for the investigation and cleanup operations at Leaking Underground Fuel Tank (LUFT) and Spills, Leaks, Investigation, and Cleanup (SLIC) sites to assure the protection of the groundwater

basin. Coordination with federal, state, county, and city agencies similarly involved is a key to the success of this program. This program's objectives are to protect the basin from future water quality degradation by ensuring that existing tanks have not leaked and that future chemical releases are quickly identified and controlled.

Since 1988, ACWD informally provided assistance to the California Regional Water Quality Control Board - San Francisco Bay Region (Regional Board) in overseeing the investigation and remediation at LUFT and SLIC sites. In order to memorialize the terms of this participation and to further strengthen the coordination between the Regional Board and ACWD, the agencies entered into a Cooperative Agreement on June 27, 1996. ACWD entered into similar Cooperative Agreements with the Cities of Fremont, Newark, and Union City on March 25, 1997, June 26, 1997, and August 12, 1997 to further strengthen the interagency coordination and cost-effective implementation of groundwater protection within the cities. ACWD also entered into an agreement with the City of Hayward on July 27, 2000 to work cooperatively on sites which threaten or affect water quality in the portion of the City of Hayward that is within ACWD's service area (Hayward Detachment areas).

Well Ordinance Administration

Ordinances to regulate the construction, repair, reconstruction, destruction or abandonment of wells with the boundaries of the Cities of Fremont, Newark, and Union City were adopted by each city (City of Fremont Ordinance No. 950 on June 26, 1973, as amended by Ordinance No. 963 on October 16, 1973; City of Newark Ordinance No. 136 on July 12, 1973; and City of Union City Ordinance No. 109-73 on June 18, 1973). The purpose of the ordinances is:

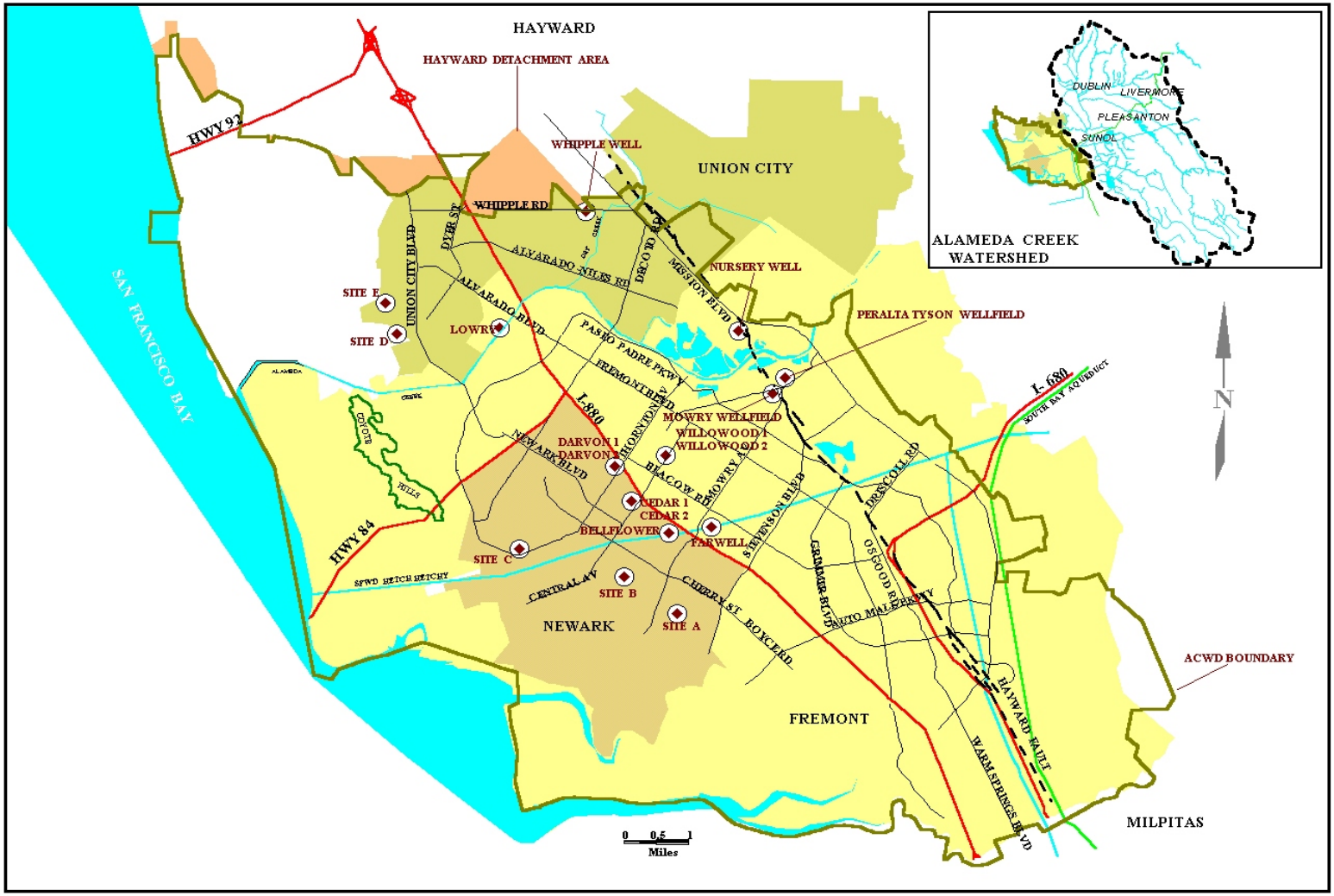
> "to provide for the construction, repair, reconstruction, and destruction of wells, including cathodic protection wells and exploratory holes, to the end

> that the groundwater found wholly or partially within the area of the [cities] will not be polluted or contaminated and that water obtained from water wells will be suitable for the beneficial uses intended and will not jeopardize the health, safety or welfare of the people of the said city, and for the destruction of abandoned wells or wells found to be public nuisances, including cathodic protection wells and exploratory holes, to the end that such wells will not cause pollution or contamination of groundwater or otherwise jeopardize the health, safety or welfare of the people of the said city."

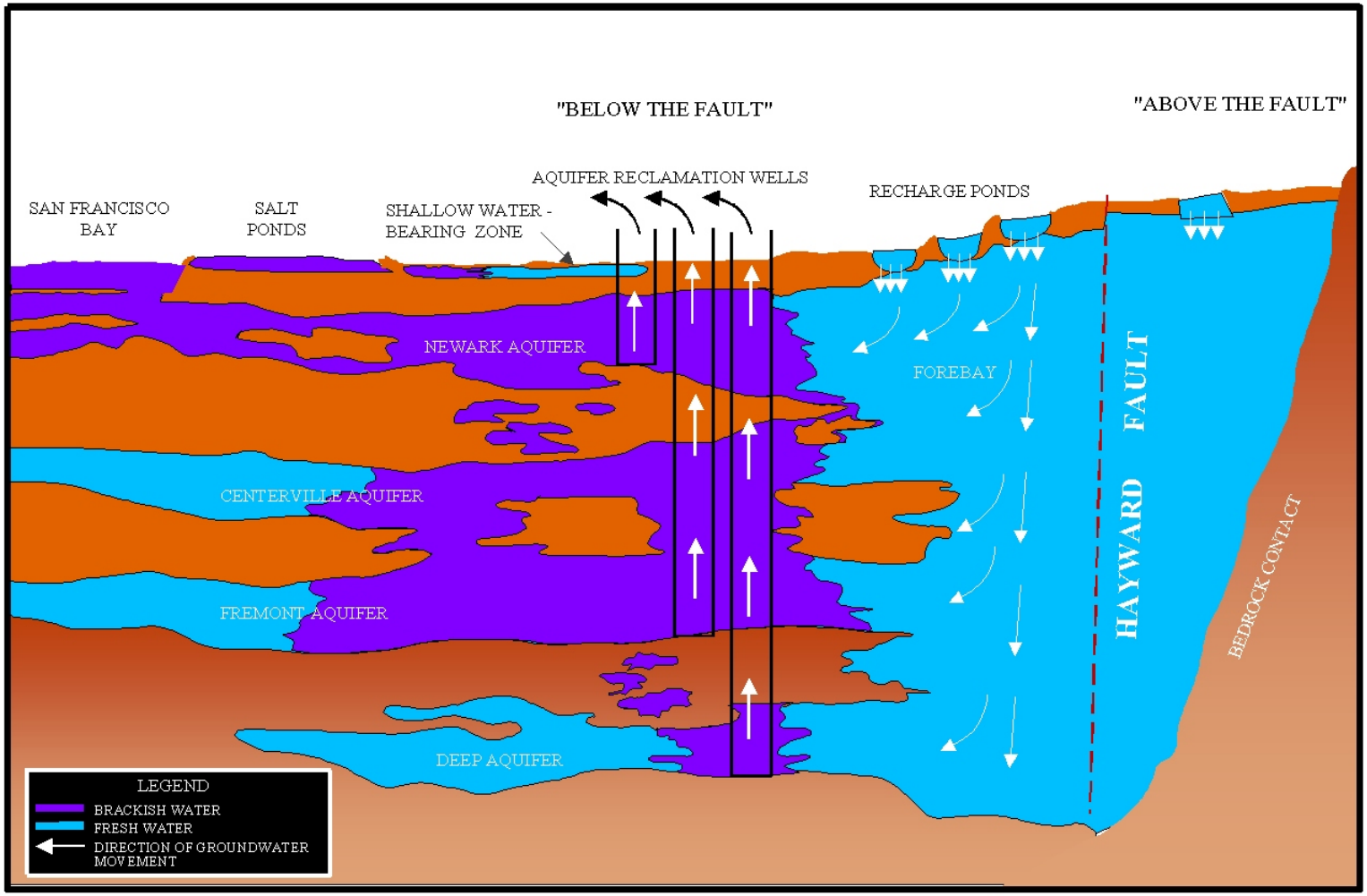
Each of the ordinances designates ACWD as the enforcing agency as defined by the Department of Water Resources and requires that a written permit be obtained from ACWD prior to conducting any of the work described above in each of the cities. By separate resolutions on January 10, 1974, ACWD agreed to implement the city ordinances and authorized the collection of fees to defray the expenses of enforcing them (Resolution No. 74-002 to implement Ordinance No. 950 as amended by Ordinance No. 963 of the City of Fremont; Resolution No. 74-003 to implement Ordinance No. 136 of the City of Newark; Resolution No. 74-004 to implement Ordinance No. 109-73 of the City of Newark). ACWD has also worked with the City of Hayward to amend the City Well Ordinance to require ACWD's approval prior to the construction, operation, or destruction of wells in Hayward Detachment areas.

ACWD has developed a well destruction program in cooperation with the cities. When land use changes are proposed, the cities require the property owners or developers to obtain a letter from ACWD indicating whether wells are located within the boundaries of the development. This process gives ACWD the opportunity to conduct a record and field search for wells before development occurs. If wells are located within the development,

the city and appropriate parties are notified. The destruction of abandoned wells then become a condition for approval of the proposed development or land use change by the city building or planning departments. ACWD also maintains a process to insure that abandoned wells are properly destroyed before water service improvements are accepted.



ATTACHMENT 2 - ALAMEDA COUNTY WATER DISTRICT GROUNDWATER FACILITIES



ATTACHMENT 3 - NILES CONE GROUNDWATER BASIN SCHEMATIC