



Annex to 2011 Association of Bay
Area Governments
Local Hazard Mitigation Plan
Taming Natural Disasters

Alameda County Water
District

Alameda County Water District

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Introduction

The Alameda County Water District (ACWD) is a retail water purveyor with a service area of approximately 105 square miles encompassing the Cities of Fremont, Newark and Union City and a population of over 330,000 people.

The District was established in 1914 under the California County Water District Act and is governed by a five-member Board of Directors. It was originally created to protect the groundwater basin, conserve the waters of the Alameda Creek Watershed and develop supplemental water supplies, primarily for agricultural use. In 1930, urban distribution became an added function of the District.

Today, the District provides water to over 80,000 primarily urban customers: approximately 70% of supplies are used by residential customers, with the balance (approximately 30%) utilized by commercial, industrial, institutional and large landscape customers. Total distribution system water use (including system losses) was approximately 47,000 Acre-Feet in fiscal year 2009-2010, or an average of over 45 million gallons per day.

ACWD has three major sources of water supply:

- State Water Project (40%),
- Hetch-Hetchy Reservoir and the San Francisco PUC (20%), and
- Alameda Creek Watershed Run-Off (40%).

ACWD has an annual operating and capital budget of approximately \$100 Million and over 200 full-time employees. It operates approximately 825 miles of pipeline, has 12 reservoirs and tanks, and four treatment facilities:

- Mission San Jose Water Treatment Plant - 8.5 MGD capacity
- Water Treatment Plant Number Two - 21 MGD capacity
- Newark Desalination Facility - 5 MGD capacity
- Blending Facility - 50 MGD capacity

The Regional Planning Process

The Alameda County Water District has participated in various Association of Bay Area Governments (ABAG) workshops and meetings, including providing comments on the ABAG Multi-Jurisdictional Local Hazard Mitigation Plan (MJ-LHMP) work products including reviewing draft priorities and providing input for reaching consensus on priorities for mitigation. In particular, ACWD staff participated by:

- Attending and participating in the March 25, 2009 workshop on water supply hazards and mitigation efforts
- Attending and participating in the Lifeline and Hazards Review Committee meetings in May and September 2009 when the development of the ABAG-led multi-jurisdictional plan was under development, and
- Commenting on draft versions of that plan.

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For more information on these meetings and for rosters of attendees, please see Appendix A and H in the ABAG 2010 MJ-LHMP. In addition, ACWD has provided information on facilities that are defined as “critical” to ABAG.

The Local Planning Process

The Alameda County Water District staff met to identify and prioritize appropriate mitigation strategies. Personnel involved in these meetings included the Operations Department Manager, Project Engineering staff, the Emergency Services Supervisor, and other management team personnel. At the meeting, items identified included general priorities, mitigation strategies, prioritization of said strategies, appropriate departments for implementation of strategies, and review of preliminary budgets and potential funding sources for strategies designated as “High” priority for ACWD-owned-and-operated facilities. Typically, each person at the meeting was responsible for communicating existing efforts and thoughts on appropriate future action in their area of expertise. For example, Project Engineering staff together with the Emergency Services Supervisor was most familiar with the needed mitigation actions for key critical facilities.

Review and Incorporation of Existing Information

This process involved consideration of both the hazard and the risk information developed by ABAG as discussed in the overall multi-jurisdictional Local Hazard Mitigation Plan, as well as the hazard and risk assessments contained in ACWD’s internal evaluations as described on pages 4-8.

Process for Updating Plan Sections

ACWD did not participate in the 2005 multi-jurisdictional Local Hazard Mitigation Plan. Thus, none of the sections in this Annex are updates of a prior Annex.

Public Meetings

The public had two opportunities to comment on the draft Annex.

- (1) The Alameda County Water District provided an opportunity for public comments on the DRAFT mitigation strategies at a public meeting of the Board of Directors held on September 10, 2009 at 6 P.M. at the ACWD offices located at 43885 So. Grimmer Boulevard in Fremont, California. The meeting and agenda item was advertised on our ACWD website (www.acwd.org) and through the public noticing of all ACWD Board meetings. Public comments of support and questions relative to clarification of the planning process were received and addressed at this meeting.
- (2) The draft mitigation strategies were also published on the ACWD website (www.acwd.org) for public viewing. No public comments were received from this internet posting.

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The Alameda County Water District Board of Directors will adopt the plan in a public meeting via an official Resolution upon pre-approval by FEMA. The mitigation strategies will be integrated into the Seismic Improvement Program, Emergency Operations Plan and Capital Improvement Plan of ACWD.

It should be noted that ACWD is strongly committed to promoting operational transparency amongst its customer base, and thus will continue its practice of ensuring clear communications through various means of media in order to provide public oversight of its planning process.

Hazards and Risk Assessment

The ABAG multi-jurisdictional Local Hazard Mitigation Plan, to which this is an Annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfires, and drought). Maps of these hazards and risks are shown on the ABAG website at <http://quake.abag.ca.gov/mitigation/>. All of these impacts ACWD's planning region. The Alameda County Water District does not face any known natural disasters not listed in the ABAG multi-jurisdictional plan.

In addition to examining the maps and information on the ABAG website <http://quake.abag.ca.gov/mitigation/>, a Seismic Vulnerability Assessment was completed for the District in 2008. This report includes a risk assessment for the earthquake-related hazards. No additional reports describe the hazard or risk to the ACWD service area.

District Facility Exposure to Hazards

ACWD owns 60 facilities that it considers critical, including takeoffs, regulators, booster stations, reservoirs, water treatment plants, water tanks, a desalinization facility, and a headquarters facility.

Earthquake: Seven of these facilities are in an Alquist-Priolo Fault Rupture Study Zone associated with the Southern Hayward fault, including the Middlefield Booster Station, the Paseo Padre Takeoff, the FR2/PR2 Regulator, the Mowry Wellfield, the VII Booster Station, the Tamarack Knolls Regulator/B5, and the Scott Creek Booster Station. However, this does not mean that they are located astride a fault. All 60 facilities are all in the next to highest tier of earthquake shaking potential. Ten of these 60 critical facilities are in areas mapped as study zones for earthquake-induced liquefaction, including the Fremont Blvd. Takeoff, the FR1 Regulator, the Mayhews Road Booster Station, the Paseo Padre Takeoff, the PT Wellfield Blending Facility, the Headquarters Facility, the Sycamore Street Takeoff, the Central and Cherry Takeoff, the Newark Desalinization Facility, and the Canyon Heights Booster Station. Six of these 60 facilities are in areas mapped as study zones for earthquake-induced landslides by the California Geological Survey, including the Middlefield Booster Station, the Curtner Road

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Booster Station, the PR1 Regulator, the Mayhew Reservoir, the Canyon Heights Tank, and the Vineyard Heights Tank.

Tsunami: The December 2009 version of the CalEMA tsunami evacuation planning maps indicated that none of the ACWD facilities are in this area.

Flooding: None of these facilities are in the 100-year flood plain, and only the Mayhews Road Booster Station is in the area mapped by FEMA as being subject to a 500-year flood.

Landsliding: Only three of these 60 facilities are in an area mapped as having significant existing landslides by the U.S. Geological Survey, including Patterson Reservoir, the Avalon Heights/Santa Monica Regulator, and the East Warren/Windmill Drive Regulator.

Wildfire: While none of these facilities are in an area mapped as subject to very high or extreme wildfire threat, eight are mapped as subject to a high wildfire threat, including the Mission San Jose Tank, the Avalon Tank, the Hidden Valley Tank, the Mayhew Reservoir, the Vineyard Heights Tank, the Winding Vista Com. Regulator, the Avalon Heights/Santa Monica Regulator, and the Appian Tank. In addition, 45 of the 60 facilities are within the area mapped by CalFIRE as within the wildland-urban-interface fire threat.

Dam Failure Inundation: Ten of these facilities are in an area subject to dam inundation – most subject to inundation from any of three dams, and one from a single dam. The facilities impacted include: Fremont Blvd. Take-off, the Patterson Reservoir, the Mayhews Rd. Booster Station (the facility only subject to inundation from one dam), the PT Wellfield Blending Facility, the Headquarters Facility, the Sycamore Street Takeoff, the Central and Cherry Takeoff, the Newark Desalinization Facility, the Canyon Heights Booster Station, and the Mowry Wellfield.

Delta Levee Failures: The ACWD facilities are not in an area protected by Delta levees.

Drought: To the extent that operations of ACWD are impacted by drought conditions, plans for this contingency are covered within the District's Integrated Water Management Plan as well as the Urban Water Management Plan.

Sea Level Rise: None of the facilities of ACWD are in areas inundated by either 16 inches or 55 inches of sea level rise.

Pipeline Exposure to Hazards

ACWD operates 825 miles of pipelines.

Earthquake: 63 miles of the 825 miles of pipelines owned by the District are in an Alquist-Priolo Fault Rupture Study Zone for the Southern Hayward fault. However, only a limited number of these pipelines cross the fault. The 2008 Seismic Vulnerability Assessment identifies eight locations where major pipelines, ranging in size from 16" in diameter to 48" in diameter, cross the Southern Hayward fault. However, they are all in the next to highest tier of earthquake

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shaking potential. In addition, 172 miles of these pipelines are in areas of significant liquefaction susceptibility mapped by the U.S. Geological Survey or the California Geological Survey. Finally, seven miles of pipelines are estimated to be in areas mapped as study zones for earthquake-induced landslides by the California Geological Survey.

Tsunami: As underground facilities, pipelines are not in a position to be subject to long-term impacts of tsunami inundation.

Flooding: None of these pipelines are in the areas expected to be flooded for extended periods of time that could develop the type of sedimentation problem that occurred during the long-term flooding of New Orleans.

Landsliding: Approximately seven miles of these pipelines are in areas mapped by the U.S. Geological Survey as having significant existing landslides.

Wildfire: As underground facilities, pipelines are not in a position to be subject to long-term impacts of wildfire.

Dam Failure Inundation: As underground facilities, pipelines are not in a position to be subject to long-term impacts of dam inundation.

Delta Levee Failures: The ACWD pipelines are not in an area protected by Delta levees.

Drought: To the extent that operations of ACWD are impacted by drought conditions, plans for this contingency are covered within the District’s Integrated Water Management Plan as well as the Urban Water Management Plan.

Risk Assessment

The earthquake hazard information described above, together with more detailed information on the pipeline materials and connections associated with ACWD, were used to estimate the approximate number of repairs, leaks, and breaks associated with five scenario earthquakes in the 2008 Seismic Vulnerability Study. The results are shown in the following table.

Scenario	Repairs					No. of Leaks	No. of Breaks
	Fault Rupture	Shaking	Liquefaction	Landslide	Total		
Hayward N+S, M 7.1	106	83	1526	232	1881	895	986
Hayward S, M 6.67	106	67	1077	196	1392	649	743
San Andreas, M 7.9	0	51	914	96	1019	514	505
Calaveras N, M 6.78	0	42	339	116	463	235	228
Loma Prieta, M 6.9	0	16	3	0	19	15	4

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In addition, the 2008 Seismic Vulnerability Study examined the age and construction of other ACWD facilities and concluded several of these facilities need upgrades. In summary:

- There will be between 752 and 2,445 pipe repairs in the ACWD pipe distribution system.
- The damage to pipes will result in very high leakage rates, resulting in emptying
- of most ACWD potable water reservoirs and tanks within about 5 hours.
- Water outages for some ACWD customers will last up to 210 days.
- Water availability for fire service in the first 24 hours after the earthquake will be very poor in most areas.
- There will be about \$1.8 billion (in 2008 dollars) in economic impacts within the District's service area, due to the lack of water service.

While a large number of facilities are in areas mapped as being in the wildland-urban-interface fire threat area, ACWD facilities are either underground or, if structures, have asphalt shingles, concrete tile, or metal roofs.

Finally, roadway and building damage in ACWD's service area may result in delays in recovery that may necessitate on-going communication with service vehicles to ensure that repairs to pipelines and critical facilities are completed in a timely manner.

The District plans to continue to work with ABAG to develop specific information about the kind and level of damage to buildings, infrastructure, and critical facilities which might result from any of the hazards previously noted.

Hazards Conclusion

The Alameda County Water District has reviewed the hazards identified and ranked the hazards based on past disasters and expected future impacts. The conclusion is that earthquakes (including fault rupture, shaking, and ground failure due to landslides or liquefaction), and, to a lesser extent, wildland-urban-interface fire threat pose the most significant risk for potential loss.

Repetitive Loss Properties

The ACWD facilities are not repetitive loss properties for flooding.

Past Occurrences of Disasters (natural and human-induced)

The Loma Prieta Earthquake of 1989 is an example of the kind of large-scale disaster which can strike the Bay Area. It killed 63 persons, injured 3,757, and displaced over 12,000 persons. With over 20,000 homes and businesses damaged and over 1,100 destroyed, this quake caused approximately \$6 Billion of damage. Reconstruction continues some two decades later as the replacement for Oakland-Bay Bridge is still several years from completion.

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More information on State and Federally declared disasters in Alameda County and the ACWD service area can be found at <http://quake.abag.ca.gov/mitigation/ThePlan-D-Version-August10.pdf>

The ACWD service area has experienced a number of different disasters over the last 50 years, including numerous earthquakes, floods, droughts, wildfires, energy shortages, landslides, and severe storms. In addition to the declared disasters noted in Appendix D, the two most locally significant incidents that have impacted ACWD in the last several years include:

- The Loma Prieta Earthquake in October 1989 was a magnitude 6.9 earthquake whose most spectacular result near the ACWD service area was the collapse of the Cypress Structure approximately 20 miles to the north along the I-880 freeway. As a result of that earthquake, ACWD did not have significant damage directly to its system.
- The El-Nino storms of 1997-1998. As a result of these storms, ACWD suffered significant landslide damage around several of its facilities. These damages required emergency mitigation actions during the event(s) as well as engineered slope and structure repairs during the following Spring and Summer of 1998.

National Flood Insurance Program

As special district, ACWD is not eligible to participate in the National Flood Insurance Program (NFIP).

Mitigation Goals and Objectives

The goal of the ABAG MJ-LHMP is to maintain and enhance a disaster-resistant region by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters. This goal is unchanged from the 2005 plan and is the goal of the Alameda County Water District in designing its mitigation program.

Mitigation Activities and Priorities

Existing Mitigation Activities

ACWD was not a participant in the 2005 ABAG-led Local Hazard Mitigation Plan. However, ACWD has been committed to hazard mitigation for many years. The existing mitigation strategies, including those that are fully funded, and are underfunded, are listed on pages 10-17.

ACWD has utilized, and will continue to utilize, the latest code standards during the design and construction of any future buildings or facilities.

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Future Mitigation Actions and Priorities

As a participant in the 2010 ABAG multi-jurisdictional planning process, the staff of ACWD helped in the development and review of the comprehensive list of mitigation strategies in the overall multi-jurisdictional plan. The decision on priority for specific mitigation strategies for ACWD was made based on a variety of criteria, not simply on an economic cost-benefit analysis. These criteria include being technically and administratively feasible, politically acceptable, socially appropriate, legal, economically sound, and not harmful to the environment or our heritage.

These draft priorities were submitted to ACWD management and Board of Directors for review. The draft priorities will be provided to the ACWD Board of Directors for adoption pending approval of this LHMP by FEMA.

The District planning team also prioritized specific mitigation tasks for the next 5-15 years. This list includes implementation process, funding strategy, responsible agency, and approximate time frame. The full list of mitigation strategies is included as an attachment to this Annex. This list includes implementation process, funding strategy, and responsible agency.

Based on the hazard exposure information described above, the principal capital outlays will be associated with implementing the recommendations from the 2008 Seismic Vulnerability Study, and fall under mitigation strategy GOVT-a-1 and INFR-a-1 with a priority of “Existing Program, Underfunded.” Specifically, the following activities have been identified:

- Improve emergency response activities (relates to several strategies, as specified later in this section)
- Conduct minor upgrades to critical equipment (GOVT-a-4)
- Upgrade the most critical pipelines crossing the Hayward fault (INFR-b-3)
- Install seismic resistant large diameter backbone pipelines through the highest-risk liquefaction areas (INFR-e-1)
- Prepare additional emergency response tools to estimate pipe damage and to coordinate pipe repair (INFR-a-6)
- Upgrade of non-structural equipment (GOVT-a-4)

Responsibility for implementation of these activities is with ACWD Operations and Engineering. The goal of the program is to complete the critical activities within 15 years. However, if grant funding or other changes in financing become available, ACWD would prefer to complete critical portions of this effort within five-to-ten years.

These critical improvements are estimated to cost \$43.2 dollars (in 2008 dollars). Securing the budget funding for these improvements is currently in process and will be part of the District’s Capital Improvement Plan budget spanning the next 15 years. The improvements are being categorized by priority (i.e. greatest risk mitigation benefit received per investment by project) and supportive grant funding to effect and expedite the improvements is being sought.

In addition, the District has determined the following very high and high priorities for mitigation:

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- (GOVT-a-3 and INFR-b-9) Very High Priority - *Clarify to workers in critical facilities and emergency personnel, as well as to elected officials and the public, the extent to which the facilities are expected to perform only at a life safety level (allowing for the safe evacuation of personnel) or are expected to remain functional following an earthquake.* This strategy is included within plan for public outreach resulting from 2008 seismic vulnerability study
- (ENVI-a-12) High Priority of ACWD / State Agencies including DWR, Water Resources Control Board, and other State of California agencies - *Develop and implement a program to control invasive and exotic species that contribute to fire and flooding hazards (such as eucalyptus, cattails, and cordgrass). This program could include vegetation removal, thinning, or replacement in hazard areas where there is a direct threat to structures.*

ACWD is in the process of considering a review, update, and enhancement of the existing Business Continuity Planning (BCP) effort. Thus, the following three strategies have been given a High Priority:

- (GOVT-b-4) - Develop a continuity of operations plan that includes back-up storage of vital records, such as plans and back-up procedures to pay employees and vendors if normal finance department operations are disrupted, as well as other essential electronic files.
- (GOVT-b-5) - Plan for the emergency relocation of government-owned facilities critical to recovery, as well as any facilities with known structural deficiencies or in hazardous areas.
- (GOVT-c-1) - Develop a plan for short-term and intermediate-term sheltering of your employees.

On-Going Funded and Underfunded Mitigation Strategy Programs

ACWD has many on-going mitigation programs that help create a more disaster-resistant region and utility systems. Collaboratively working with numerous other agencies at the federal, state and local levels, the District has implemented institutional as well as physical infrastructure improvements. The following list highlights those programs identified as *Existing Programs* in the mitigation strategy spreadsheet.

- Assess the vulnerability of critical facilities to damage in natural disasters and make recommendations for appropriate mitigation. (GOVT-a-1) - action taken, in part, within the 2008 seismic vulnerability study
- Encourage joint meetings of security and operations personnel at critical facilities to develop innovative ways for these personnel to work together to increase safety and security. (GOVT-a-5) - inherent to Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)

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- Ensure that new government-owned facilities comply with and are subject to the same or more stringent regulations as imposed on privately-owned development. (GOVT-a-10) – District mission objective
- Comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling government-owned facilities. (GOVT-a-11) – District mission objective
- Prior to acquisition of property to be used as a critical facility, conduct a study to ensure the absence of significant structural hazards and hazards associated with the building site. (GOVT-a-12) – District mission objective
- Ensure that any regulations imposed on private-owned businesses related to repair and reconstruction (see Economy Section) are enforced and imposed on local government's own buildings and structures. (GOVT-a-13) – District mission objective
- Establish a framework and process for pre-event planning for post-event recovery that specifies roles, priorities, and responsibilities of various departments within the local government organization, and that outlines a structure and process for policy-making involving elected officials and appointed advisory committees. (GOVT-b-1) - inherent to Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)
- Establish a goal for the resumption of local government services that may vary from function to function. (GOVT-b-3) - Included in Emergency Operations Plan mission objective
- Encourage your employees to have a family disaster plan. (GOVT-c-2) - Included in Emergency Operations Plan mission objective
- Periodically assess the need for changes in staffing levels, as well as for additional or updated supplies, equipment, technologies, and in-service training classes. (GOVT-c-5) - Included in Emergency Operations Plan mission objective
- Harden emergency response communications, including, for example, building redundant capacity into public safety alerting and/or answering points, replacing or hardening microwave and simulcast systems, adding digital encryption for programmable radios, and ensuring a plug-and-play capability for amateur radio. (GOVT-c-8) - Included in Emergency Operations Plan mission objective
- Maintain the local government's emergency operations center in a fully functional state of readiness. (GOVT-c-10) - Included in Emergency Operations Plan mission objective
- Expand or participate in expanding traditional disaster exercises involving city and county emergency personnel to include airport and port personnel, transit and infrastructure providers, hospitals, schools, park districts, and major employers. (GOVT-c-11) - Included in Emergency Operations Plan mission objective
- Maintain and update as necessary the local government's Standardized Emergency Management System (SEMS) Plan and the National Incident Management System (NIMS) Plan, and submit an appropriate NIMSCAST report. (GOVT-c-12) - Included in Emergency Operations Plan mission objective
- Continue to participate not only in general mutual-aid agreements, but also in agreements with adjoining jurisdictions for cooperative response to fires, floods, earthquakes, and other disasters. (GOVT-c-13) - Included in Emergency Operations Plan mission objective

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- Monitor weather during times of high fire risk using, for example, weather stations tied into police and fire dispatch centers. (GOVT-c-17) - Included in Emergency Operations Plan mission objective
- Support and encourage planning and identification of facilities for the coordination of distribution of water, food, blankets, and other supplies, coordinating this effort with the American Red Cross. (GOVT-c-25) – Water distribution coordination is included in Emergency Operations Plan mission objective
- Promote information sharing among overlapping and neighboring local governments, including cities, counties, and special districts, as well as utilities. (GOVT-d-1) - Included in Emergency Operations Plan mission objective
- Recognize that emergency services is more than the coordination of police and fire response; it also includes planning activities with providers of water, food, energy, transportation, financial, information, and public health services. (GOVT-d-2) - Included in Emergency Operations Plan mission objective
- Encourage staff to participate in efforts by professional organizations to mitigate earthquake and landslide disaster losses, such as the efforts of the Northern California Chapter of the Earthquake Engineering Research Institute, the East Bay-Peninsula Chapter of the International Code Council, the Structural Engineers Association of Northern California, and the American Society of Grading Officials. (GOVT-d-8) - Included in Emergency Operations Plan mission objective
- Conduct and/or promote attendance at local or regional hazard conferences and workshops for elected officials and staff to educate them on the critical need for programs in mitigating earthquake, wildfire, flood, and landslide hazards. (GOVT-d-9) - Included in Emergency Operations Plan mission objective
- Cooperate with researchers working on government-funded projects to refine information on hazards, for example, by expediting the permit and approval process for installation of seismic arrays, gravity survey instruments, borehole drilling, fault trenching, landslide mapping, flood modeling, and/or damage data collection. (GOVT-d-10) - Included in Emergency Operations Plan mission objective
- As a dam owner, ACWD complies with State of California and federal requirements to assess the vulnerability of dams to damage from earthquakes, seiches, landslides, liquefaction, or security threats. (INFR a-2) - California Water Code Div. 3, Dams and Reservoirs/ California Code of Regulations, Title 23, Waters, Division 2/ Current Practices, Dept. of Water Resources
- Encourage the cooperation of utility system providers and cities, counties, and special districts, and PG&E to develop strong and effective mitigation strategies for infrastructure systems and facilities. (INFR a-3) - Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)
- Support and encourage efforts of other (lifeline infrastructure) agencies as they plan for and arrange financing for seismic retrofits and other disaster mitigation strategies. (For example, a city might pass a resolution in support of a transit agency's retrofit program.) (INFR-a-5) - Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)

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- Develop a plan for speeding the repair and functional restoration of water and wastewater systems through stockpiling of shoring materials, temporary pumps, surface pipelines, portable hydrants, and other supplies, such as those available through the Water/Wastewater Agency Response Network (WARN). Communicate that plan to local governments and critical facility operators. (INFR-a-6) Emergency Response Plan elements, Active member of CalWARN (Regional Chair)
- Engage in, support, and/or encourage research by others (such as USGS, universities, or Pacific Earthquake Engineering Research Center-PEER) on measures to further strengthen transportation, water, sewer, and power systems so that they are less vulnerable to damage in disasters. (INFR-a-7) Active participation in industry related organizations (AWWA, Water Research Foundation member, etc.)
- As a dam owner, ACWD coordinates with the State Division of Safety of Dams to ensure an adequate timeline for the maintenance and inspection of dams, as required of dam owners by State law, and communicate this information to local governments and the public. (INFR-a-13) California Water Code Div. 3, Dams and Reservoirs/ California Code of Regulations, Title 23, Waters, Division 2/ Current Practices, Dept. of Water Resources
- Encourage communication between State Emergency Management Agency (CalEMA), FEMA, and utilities related to emergencies occurring outside of the Bay Area that can affect service delivery in the region. (INFR-a-14) Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)
- Monitor scientific studies of the Sacramento-San Joaquin Delta and policy decisions related to the long-term disaster resistance of that Delta system to ensure that decisions are made based on comprehensive analysis and in a scientifically-defensible manner. Levee failure due to earthquakes, flooding, and climate change (including sea level rise and more frequent and more severe flooding) are all of concern. The long-term health of the Delta area is critical to the Bay Area's water supply, is essential for the San Francisco Bay and estuary's environmental health, provides recreation opportunities for Bay Area residents, and provides the long-term sustainability of Delta communities. While only part of the Delta is within the nine Bay Area counties covered by this multi-jurisdictional LHMP, the Delta is tied to the infrastructure, water supply, and economy of the Bay Area. (INFR-a-22) Active participation as a water industry stakeholder on Sacramento-San Joaquin Delta study and improvement workgroups.
- Include "areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture" in the list of criteria used for determining a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history). (INFR-b-3) Action taken during mitigation strategy process within 2008 seismic vulnerability study
- Comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling infrastructure facilities. (INFR-b-8) Existing program / mission objective
- Ensure a reliable source of water for fire suppression (meeting acceptable standards for minimum volume and duration of flow) for existing and new development. (INFR-c-1) Existing program / mission objective

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- Continue to repair and make structural improvements to storm drains, pipelines, and/or channels to enable them to perform to their design capacity in handling water flows as part of regular maintenance activities. (This strategy has the secondary benefit of addressing fuel, chemical, and cleaning product issues.) (INFR-d-6) Existing program objective for surface water conveyances for source water import
- Continue maintenance efforts to keep storm drains and creeks free of obstructions, while retaining vegetation in the channel (as appropriate) to allow for the free flow of water. (INFR-d-7) Existing program objective for surface water conveyances for source water import
- Provide or support the mechanism to expedite the repair or replacement of levees that are vulnerable to collapse from earthquake-induced shaking or liquefaction, rodents, and other concerns, particularly those protecting critical infrastructure. (INFR-d-12) Existing program within objectives as a water industry stakeholder on Sacramento-San Joaquin Delta study and improvement workgroups.
- Work cooperatively with water agencies, flood control districts, Caltrans, and local transportation agencies to determine appropriate performance criteria for watershed analysis. (INFR-d-15) Existing program objective within groundwater supply and recharge management efforts
- Work for better cooperation among the patchwork of agencies managing flood control issues. (INFR-d-16) Existing program objective for new project and development activities
- Include “areas subject to ground failure” in the list of criteria used for determining a replacement schedule (along with importance, age, type of construction material, size, condition, and maintenance or repair history) for pipelines. (INFR-e-1) Action taken during mitigation strategy process within 2008 seismic vulnerability study
- Provide materials to the public related to coping with reductions in water supply or contamination of that supply BEYOND regulatory notification requirements. (INFR-g-3) Existing program - public speaking (TESA Disaster Preparedness Fair), ACWD website posting
- Facilitate and/or coordinate the distribution of emergency preparedness or mitigation materials that are prepared by others, such as by making the use of the internet or other electronic means, or placing materials on community access channels or in city or utility newsletters, as appropriate. (INFR-g-5) Existing program - public speaking (TESA Disaster Preparedness Fair), ACWD website posting
- Continue to enforce State-mandated requirements, such as the *California Environmental Quality Act*, to ensure that mitigation activities for hazards, such as seismic retrofits and vegetation clearance programs for fire threat, are conducted in a way that reduces environmental degradation such as air quality impacts, noise during construction, and loss of sensitive habitats and species, while respecting the community value of historic preservation. (ENVI-a-1) Existing program
- Comply with applicable performance standards of any *National Pollutant Discharge Elimination System* municipal stormwater permit that seeks to manage increases in stormwater run-off flows from new development and redevelopment construction projects. (ENVI-a-6) Existing program
- Enforce and/or comply with the grading, erosion, and sedimentation requirements by prohibiting the discharge of concentrated stormwater flows by other than approved

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methods that seek to minimize associated pollution. (ENVI-a-7) Existing program (compliance)

- Enforce and/or comply with the hazardous materials requirements of the State of California Certified Unified Program Agency (CUPA). (ENVI-a-9) Existing program (compliance)
- When remodeling existing government and infrastructure buildings and facilities, remove asbestos to speed up clean up of buildings so that they can be reoccupied more quickly. (ENVI-a-11) Existing program (safety and compliance)
- Enforce provisions under creek protection, stormwater management, and discharge control ordinances designed to keep watercourses free of obstructions and to protect drainage facilities to conform with the Regional Water Quality Control Board's Best Management Practices. (ENVI-a-13) Existing program (compliance)
- Stay informed of scientific information compiled by regional and state sources on the subject of rising sea levels and global warming, especially on additional actions that local governments can take to mitigate this hazard including special design and engineering of government-owned facilities in low-lying areas, such as wastewater treatment plants, ports, and airports. (ENVI-b-1) Existing program (Emergency Operations planning, compliance)
- Promote and maintain the public-private partnerships dedicated to preventing the introduction of agricultural pests into regionally-significant crops, such as the glassy-winged sharpshooter into vineyards. (ENVI-c-2) While an existing program of County Offices and State Water Resources Control Board, ACWD has have active participation in the zebra mussel control issue

The following are on-going programs that are currently underfunded or partially funded by other agencies. It is the District's priority to find additional funding to sustain these on-going programs over time.

- Retrofit or replace critical facilities that are shown to be vulnerable to damage in natural disasters. (GOVT-a-2) Included within seismic improvement plans resulting from 2008 seismic vulnerability study
- Conduct comprehensive programs to identify and mitigate problems with facility contents, architectural components, and equipment that will prevent critical buildings from being functional after major natural disasters. Such contents and equipment includes computers and servers, phones, files, and other tools used by staff to conduct daily business. (GOVT-a-4) Existing program objective(s) within Emergency Response Plan and included within Capital Improvement Planning (CIP) strategies
- When installing micro and/or surveillance cameras around critical public assets tied to web-based software, and developing a surveillance protocol to monitor these cameras, investigate the possibility of using the cameras for the secondary purpose of post-disaster damage assessment. (GOVT-a-6) Existing program objective(s) within CIP physical security improvement project
- Identify and undertake cost-effective retrofit measures related to security on critical facilities (such as moving and redesigning air intake vents and installing blast-resistant features) when these buildings undergo major renovations related to other natural

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hazards. (GOVT-a-7) Existing program objective(s) within CIP physical security improvement project

- Prepare a basic Recovery Plan that outlines the major issues and tasks that are likely to be the key elements of community recovery, as well as integrate this planning into response planning (such as with continuity of operations plans). (GOVT-b-2) Included element/strategy within emergency response planning program
- Offer CERT/NERT-type training to your employees. (GOVT-c-3) Existing program / Currently encouraged for voluntary participation in city hosted courses
- Participate in developing and maintaining a system of interoperable communications for first responders from cities, counties, special districts, state, and federal agencies. (GOVT-c-7) Existing Program within ACWD Emergency Operation Plan and participation in regional effort.
- Assess the vulnerability of critical facilities owned by infrastructure operators subject to damage in natural disasters or security threats, including fuel tanks and facilities owned outside of the Bay Area that can impact service delivery within the region. (INFR-a-1) Vulnerability assessment required under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (PL 107-188). Additional vulnerability studies voluntarily completed for risk from natural disasters.
- Encourage the cooperation of utility system providers and cities, counties, and special districts, and PG&E to develop strong and effective mitigation strategies for infrastructure systems and facilities. (INFR-a-4) Capital Improvement Planning (CIP) efforts
- Pre-position emergency power generation capacity (or have rental/lease agreements for these generators) in critical buildings of cities, counties, and special districts to maintain continuity of government and services. (INFR-a-8) Existing emergency response plan elements, additional emergency power generation outlined in CIP
- Coordinate with other critical infrastructure facilities to establish plans for delivery of water and wastewater treatment chemicals. (INFR-a-19) Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)
- Establish plans for delivery of fuel to critical infrastructure providers. (INFR-a-20) Inter-Agency Collaborations - i.e. - Bay Area Security Information Collaborative (BASIC), Bay Area Water Supply and Conservation Agency (BAWSCA), Tri-City Emergency Services Association (TESA)
- As an infrastructure operator, designate a back-up Emergency Operations Center with redundant communications systems. (INFR-a-21) Action identified in mitigations outlined within 2008 seismic vulnerability study
- Install specially-engineered pipelines in areas subject to faulting, liquefaction, earthquake-induced landsliding, or other earthquake hazard. (INFR-b-4) Included within seismic improvement plans resulting from 2008 seismic vulnerability study
- Replace or retrofit water-retention structures that are determined to be structurally deficient, including levees, dams, reservoirs and tanks. (INFR-b-5) Included within Capital Improvement Planning (CIP) efforts
- Install portable facilities (such as hoses, pumps, emergency generators, or other equipment) to allow pipelines to bypass failure zones such as fault rupture areas, areas of liquefaction, and other ground failure areas (using a priority scheme if funds are not

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available for installation at all needed locations). (INFR-b-6) Included within seismic improvement plans resulting from 2008 seismic vulnerability study

- Install earthquake-resistant connections when pipes enter and exit bridges and work with bridge owners to encourage retrofit of these structures. (INFR-b-7) Included within seismic improvement plans resulting from 2008 seismic vulnerability study
- Improve monitoring of creek and watercourse flows to predict potential for flooding downstream by working cooperatively with land owners and the cities and counties in the watershed. (INFR-d-17) Existing program objective within groundwater supply and recharge management efforts
- Continue to enforce and/or comply with State-mandated requirements, such as the *California Environmental Quality Act* and environmental regulations to ensure that urban development is conducted in a way to minimize air pollution. For example, air pollution levels can lead to global warming, and then to drought, increased vegetation susceptibility to disease (such as pine bark beetle infestations), and associated increased fire hazard. (ENVI-a-3) New program to reduce GHG and carbon footprint
- Inventory global warming emissions in your own local government's operations and in the community, set reduction targets and create an action plan. (ENVI-b-2) New program to reduce GHG and carbon footprint
- Make energy efficiency a priority through building code improvements, retrofitting city facilities with energy efficient lighting and urging employees to conserve energy and save money. (ENVI-b-6) Current program
- Purchase only Energy Star equipment and appliances for local government use. (ENVI-b-7) Current program
- Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel. (ENVI-b-9) Current program
- Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production. (ENVI-b-10) Current program
- Increase recycling rates in local government operations and in the community. (ENVI-b-11) Current program

Incorporation into Existing Planning Mechanisms

The District has used, and will continue to use, a variety of project-specific mechanisms to ensure that the projects and mitigation strategies identified as existing or having relatively high priorities in this LHMP Annex are implemented.

As shown in the following list of mitigation strategies, most of ACWD's specific mitigation strategies and priorities are being implemented as part of the Capital Improvement Plan. In addition, the strategies are being implemented throughout the District organization. The information in this Annex, including the goals, objectives, and strategies identified, will be incorporated into the District's Capital Improvement Plan for prioritizing capital improvements of the District's infrastructure. For example, this Annex supports the need for these mitigation projects as integral to the mission of ACWD, while the Capital Improvement Plan is the funding

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mechanism for processing the request. ACWD is also looking at ways to apply for grants for hazard mitigation priorities identified in the 2008 Seismic Vulnerability Assessment. Specific mitigation strategies are the responsibility of ACWD's Engineering and Operations departments.

This Annex will be made available to Alameda County and other agencies within the County for their use in General Plan Safety Element, as appropriate.

The District adheres to the requirements of the California Environmental Quality Act (CEQA), which, since 1988, requires mitigation for identified natural hazards. The District has used these pre-existing programs as a basis for identifying gaps that may lead to disaster vulnerabilities in order to work on ways to address these risks through mitigation.

There are no other planning mechanisms available to District that are appropriate to incorporate this LHMP Annex.

The final strategies and Annex will be adopted in the same resolution adopting the overall LHMP by the District Board following "Pre-Approval Pending Adoption" by FEMA.

Ongoing integration of the policies and programs identified in this Local Hazard Mitigation Plan will be monitored by District Executive Management staff.

Plan Update Process

As required Disaster Mitigation Act of 2000, the Alameda County Water District will update this plan annex at least once every five years, by participating in a multi-agency effort with ABAG and other agencies to develop a multi-jurisdictional plan.

The District's Health & Safety / Emergency Services Supervisor will ensure that monitoring of this Annex will occur. The plan will be monitored on an on-going basis. However, the major disasters affecting our District, legal changes, notices from ABAG as the lead agency in this process, and other triggers will be used. For example, if a structural engineering evaluation shows that a major risk exists at more or more facilities based on data collected from a future earthquake, the priority associated with upgrading those facilities will be re-evaluated. Finally, the Annex will be a discussion item on the agenda of the meeting of Department leaders at least once a year. At that meeting, the department heads will focus on evaluating the Annex in light of technological and political changes during the past year or other significant events. The Department leaders will be responsible for determining if the plan should be updated.

The District is committed to reviewing and updating this plan annex at least once every five years, as required by the Disaster Mitigation Act of 2000. The District's Health & Safety / Emergency Services Supervisor will contact ABAG four years after this plan is approved to ensure that ABAG plans to undertake the plan update process. If so, the District again plans to participate in the multi-jurisdictional plan. If ABAG is unwilling or unable to act as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including the County's Office of Emergency Services. Counties should then work together to identify another regional forum for developing a multi-jurisdictional plan.

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The District is committed to public participation. All ACWD Board meetings are open to the public and the public is invited to comment on items on the Board Agenda. The public will continue to be involved whenever the plan is updated and as appropriate during the monitoring and evaluation process. Prior to adoption of updates, the District will provide the opportunity for the public to comment on the updates. A public notice will be posted prior to the meeting to announce the comment period and meeting logistics. The District is committed to improving public participation in the update process over the next five years. To improve and augment this process, ACWD will consider additional direct mailing communications with all customers as well as specific website announcements aimed at promoting wider public knowledge of the issues related to disaster mitigation and the planning process.

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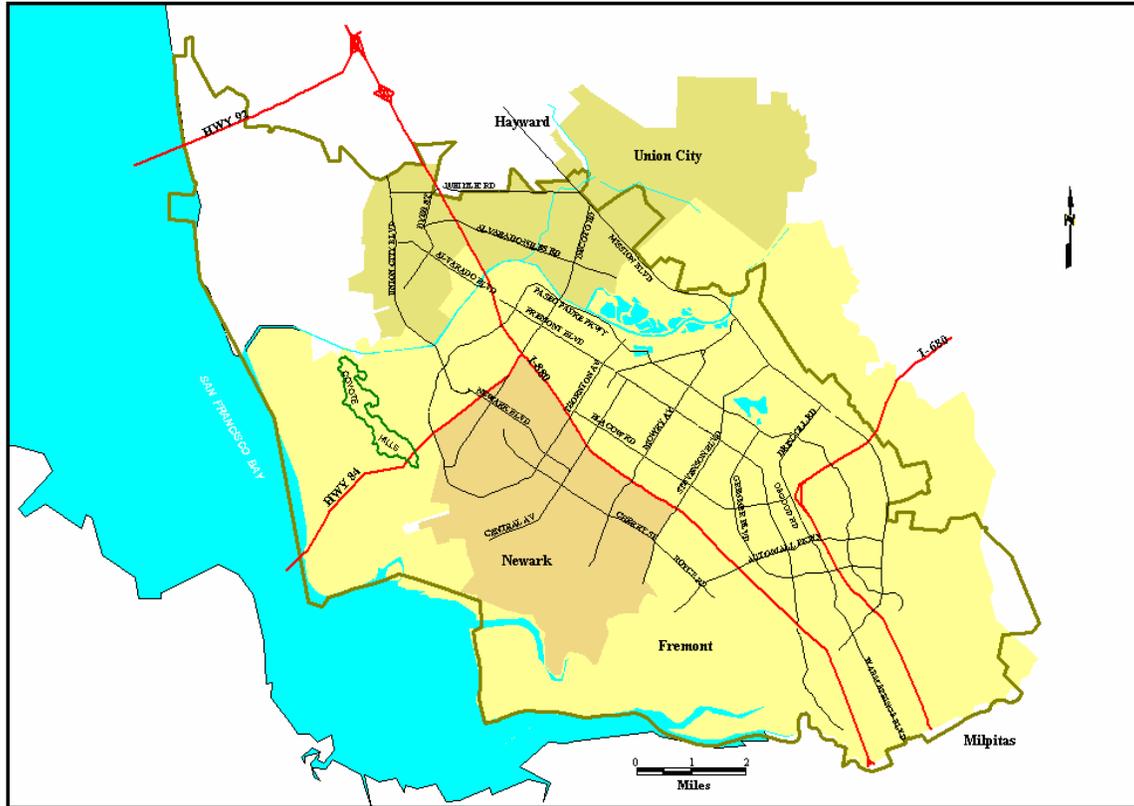
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Exhibit A - Alameda County Water District Service Area Map



The Alameda County Water District (ACWD) is a retail water purveyor with a service area of approximately 105 square miles encompassing the Cities of Fremont, Newark and Union City and a population of over 330,000 people.

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Exhibit B - ACWD Mitigation Strategy Spreadsheet

[Available on LHMP CD or at <http://www.abag.ca.gov/bayarea/eqmaps/mitigation/strategy.html>]