

CHAPTER 5 DESALINATION

This chapter describes local opportunities for desalination, including ACWD's Newark Desalination Facility and the District's plans for expanding capacity to augment this source of water supply.

5.1 DESALINATION FACILITY PLANNING AND BACKGROUND

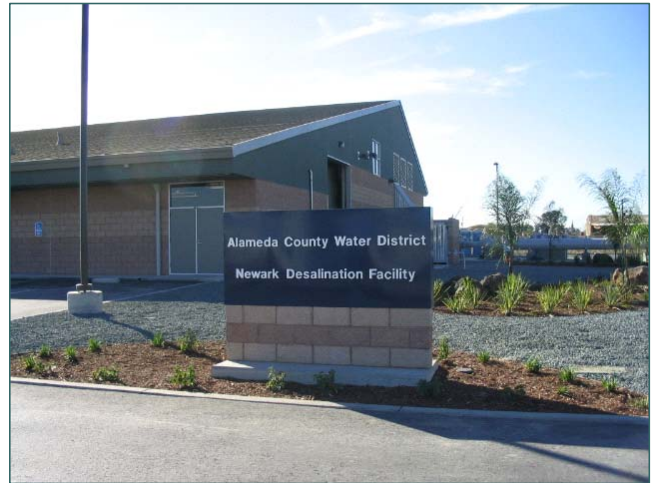
As part of the development of the District's 1995 Integrated Resources Plan, the District evaluated an extensive list of potential water supply alternatives. This included supply-side alternatives (i.e. supplemental sources, facilities, and operational modifications) and demand-side (i.e. conservation) alternatives. ACWD's goal was to end up with a manageable number of the most effective resource options. Included within the potential supply-side alternatives was brackish groundwater desalination and seawater desalination. However, because of the high costs of seawater desalination and potential issues with concentrate disposal, the seawater desalination alternative was eliminated from further consideration during the screening process of the IRP alternatives.

After careful consideration, ACWD adopted an IRP strategy that consists of a mix of conservation, operational alternatives, new supplies and facilities. This included implementation of a Phase 1 (5 mgd) and Phase 2 (increase to 10 mgd) brackish groundwater desalination facility.

5.2 CURRENT DESALINATION CAPACITY AND USE

On September 19, 2003, the Alameda County Water District dedicated the first brackish water desalination facility in northern California (Figure 5-1). The Newark Desalination Facility (Desal Facility) produces potable water by removing salts and other minerals from brackish groundwater. The Newark Desalination Facility has an existing capacity of 5 mgd, and provides up to 10% of the District's water supply.

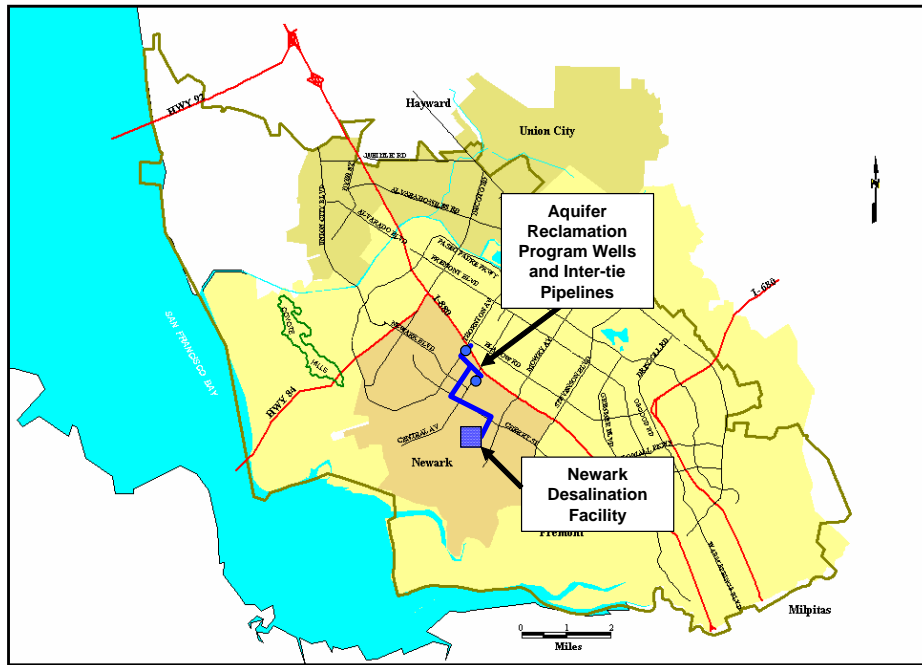
The source of water for the Newark Desalination Facility is from portions of the Niles Cone Groundwater Basin that contain brackish groundwater due to previous years of seawater intrusion (see Figure 5-2). The District operates a series of wells that remove brackish water (approximate TDS range of 1,100 to 2,400 mg/l from the groundwater basin).



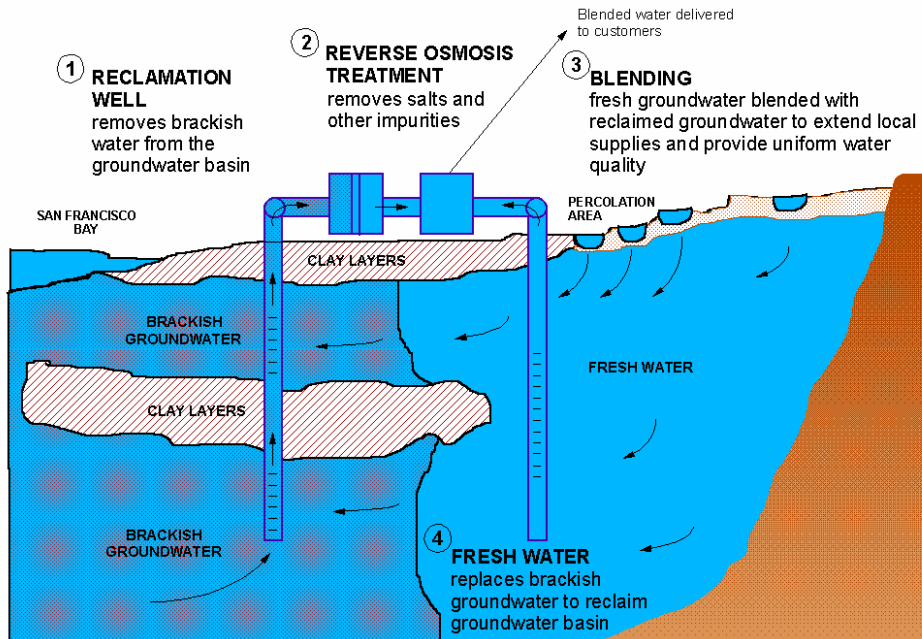
This program, called the Aquifer Reclamation Program (ARP), was developed to stop the spread of saltwater already in the groundwater basin and to reclaim the aquifers of the basin for future potable use. Brackish water from some of these wells is treated at the Newark Desalination Facility rather than being allowed to flow back into San Francisco Bay. The Newark Desalination Facility utilizes reverse osmosis to convert brackish water to potable water.

The soft water produced by the Desalination Facility is blended with the harder groundwater to maintain a more uniform water hardness throughout the year. So in addition to being a relatively new local source of water, the Desalination Facility improves both the quality and reliability of the ACWD water supply.

**Figure 5-1
Newark Desalination Facility and Associated Facilities**



**Figure 5-2
Newark Desalination Facility and Aquifer Reclamation Program Schematic**



The Newark Desalination Facility provides the following water supply and water quality benefits:

- **Improved dry year water supply reliability:** The District's IRP identified potential dry year water supply shortages of up to 53% (37,400 AF) in 2030 without further action. To improve dry year supply reliability, the District-adopted water management strategy includes conservation, reclamation, off-site groundwater banking and desalination. The desalination facility improves ACWD's dry year supply reliability by providing a new source of potable supply for the service area.
- **Improved water system reliability and security:** The Newark Desalination Facility improves the overall reliability and security of the District's supplies by providing a source of supply west of the Hayward Fault and Calaveras Fault. ACWD's imported water supplies are conveyed via aqueducts (South Bay Aqueduct and Hetch-Hetchy Aqueduct) that are susceptible to failure due to earthquakes along these faults. The Newark Desalination Facility provides ACWD with increased local production capacity, which is key for the District in the event of temporary loss of imported water supplies or production facilities east of the Hayward Fault due to a seismic event.
- **Increased water production capacity:** In addition to the District's dry year reliability needs, the District's IRP also identified the need for additional water production capacity to meet peak summer demands. Although water conservation (targeting outdoor use) and recycled water programs identified in the IRP will help to reduce some of the additional peak demands, additional production capacity in the service area is also needed. The Newark Desalination Facility helps meet the existing and future peak summer demands by providing additional production capacity.
- **Improved water quality:** Because the District's existing potable groundwater supplies are relatively high in hardness, the District blends these groundwater supplies with San Francisco Regional Water System supplies to reduce the overall hardness and improve water quality. Implementation of the desalination facility has allowed the District to further improve water quality for its customers and to provide a supply that meets the District-adopted hardness goals.
- **Reduced future reliance on imported supplies:** The Newark Desalination Facility allows ACWD to reclaim local, brackish groundwater for potable use, reducing the District's need for additional reliance on imported water supplies from the Delta to meet increasing demands in the service area.
- **Groundwater basin protection and reclamation:** The source of the brackish groundwater comes from ACWD's Aquifer Reclamation Program (ARP) in the local Niles Cone Groundwater Basin. The ARP program is an on-going program in which ACWD has been reclaiming to freshwater conditions the portions of the local groundwater basin that have previously been impacted by seawater intrusion from San Francisco Bay. Historically, ACWD has pumped the brackish groundwater out of the basin and disposed of it back to San Francisco Bay. However, the desalination facility now treats this brackish water and allows it to be used as a potable supply.

5.3 PLANNED INCREASED CAPACITY AND USE

ACWD's current plans are to expand the capacity of the desalination facility from 5 mgd to 10 mgd. The expansion is planned to be completed by 2009. This Phase 2 Desalination Project will utilize the most advanced reverse osmosis technology currently available to treat brackish groundwater. Given the high quality of the treated water, the expanded Desal Project treated water will be blended with harder groundwater to improve the overall quality of the water delivered to customers and to the extent possible, extend the local supplies.