



Alamogordo Regional Water Supply

New Mexico's First Large-Scale Municipal
Desalination Project



Present Water Supply

Alamogordo differs from most municipalities in the State of New Mexico in that the majority of its potable water supply comes from surface water.

- City collects **surface water** from the Sacramento Mountains located to the east of the city primarily from the La Luz/ Fresnel and Alamo Canyons. Combined surface water rights from these sources is 3,969 afy.
- The City also pipes **surface water** from Bonito Lake. Located at the head waters of the Rio Bonito about 90 miles north of the city. Surface water rights from this source is approximately 1,449 afy. Surface water from Bonito Lake is shared with Holloman Air Force Base which also has water rights totaling 1,449 afy. The City lost the ability to draw water from Bonito Lake in 2012 due to the Little Bear Fire and the subsequent flooding that followed.
- The City's main source of **groundwater** is the La Luz Well Field located north of the city. Additional wells located around the city supplement the La Luz Well Field. The City has the right to divert 3,931 afy of **groundwater**. However because of the poor quality of water, not all wells contribute to the city's potable water supply.



Supply & Demand

Because of availability and better quality, the City has historically relied heavily on surface water to meet the needs of its citizens. However, increasing population and recent droughts dictate that such heavy reliance on surface water is no longer a viable option.

- Between 1990 and 1997, 87% of the City's water supply was available from surface flows.
- From 1997 to 2002, only 55% of the City's water was available from surface flows.
- As surface flows decreased due to drought, the City was forced to rely on more groundwater.
- Increased use from existing groundwater sources is not sustainable because of hydrological conditions and poor groundwater quality.
- As water supplies were decreasing, demand was increasing – the City's 2000 population was 35,582 and according to the University of New Mexico Bureau of Business and Economic Research, the City's population is projected to increase to nearly 59,000 by 2045.
- In the mid-to-late 1990s the City began carefully assessing the existing water uses and began looking for new sources of water.



Response & Analysis of Options

In the early 1990s, the City's water use was approximately 260 gallons per capita per day ("gpcd"). The City implemented conservation measures to drop its per capita water use.

- In the mid-1990s, the City constructed New Mexico's first municipal tertiary treatment wastewater facility whereby all effluent is treated and pumped back to the City for irrigation use on parks, golf course, recreation fields and open spaces.
- The City's water reservoirs were lined and covered to prevent leakage and evaporation.
- The City passed a number of water conservation ordinances to encourage decreased water use.
- The result of the above measures was a reduction from 260 gpcd usage in the early 1990s to 165 gpcd in the 1999-2001 period – a 40% reduction.
- Because of the drought that began in the late 1990s and dwindling surface water flows the City adopted aggressive ordinances limiting water use and instituted water use surcharges – these efforts helped further reduce usage to approximately 140 gpcd – driven by supply rather than demand.



Response & Analysis of Options

While progress continues to be made with conservation, the City is aware that conservation alone cannot provide an adequate, additional source of water for both present and future needs.

The City established criteria for a new water supply

- Drought resistant
- Good quality that could be blended with City's existing supplies
- Independent, complimenting and maximizing the City's existing resources
- Large enough to justify scope of project
- Cost competitive and cost efficient

The City realized that new appropriations of surface and fresh groundwater were not feasible. The Sacramento Mountains are fully appropriated and as Alamogordo is located in the Tularosa basin, covered by Basin Administrative Criteria, new appropriations of fresh groundwater of any significant magnitude were restricted.



Response & Analysis of Options

The City considered many options for new water supplies including:

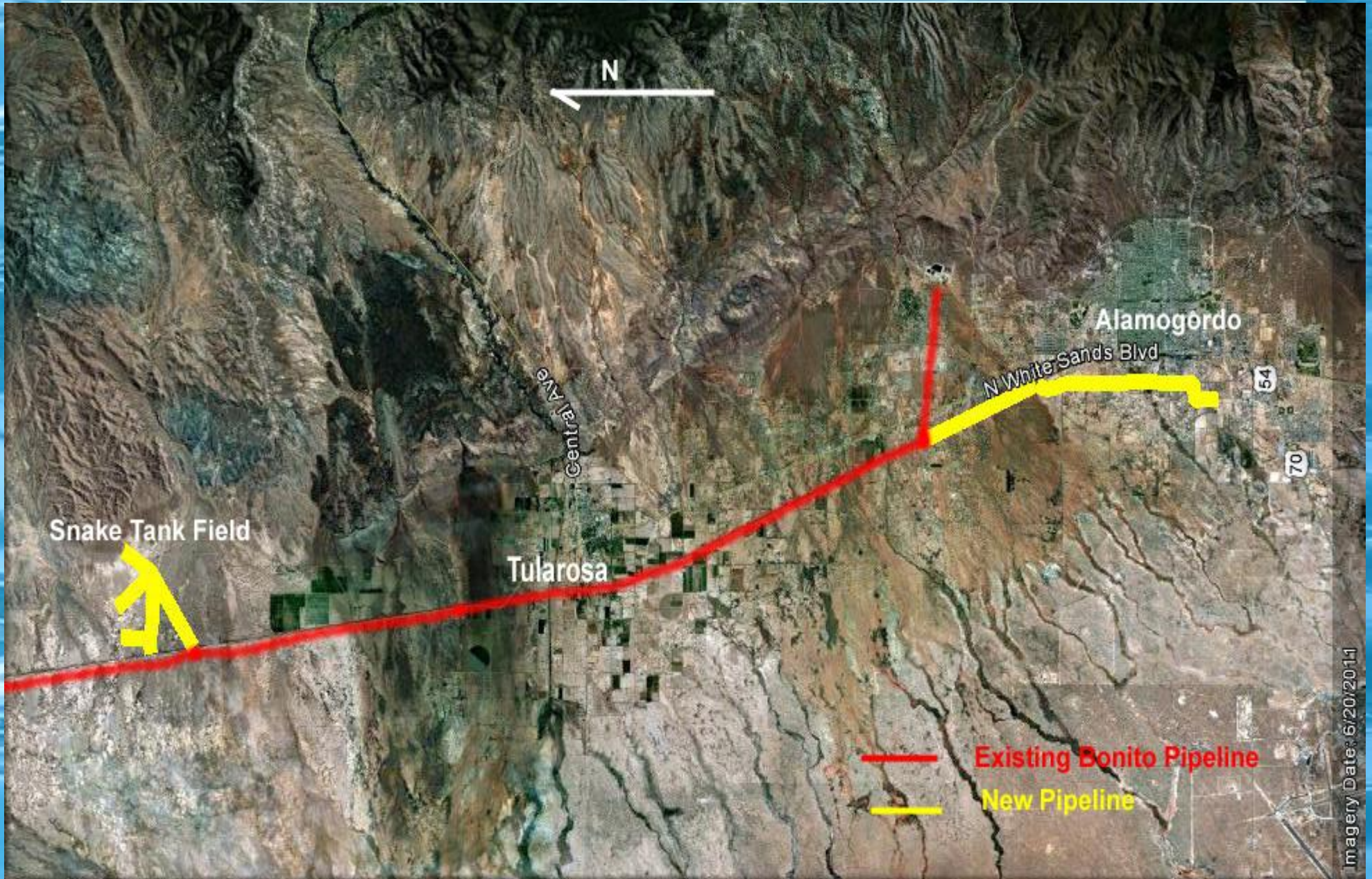
- Buying irrigation water rights to be transferred for municipal use
- Importation from the Salt Basin
- Outside bulk water purchases
- Agricultural water exchange
- Aquifer storage and recovery
- Desalination (brackish groundwater is abundant in the Tularosa Basin)

The City concluded that the only way to get a large drought-resistant appropriation, without decades of applications for small appropriations and/or transfers, was to pursue a well field that would divert brackish groundwater in conjunction with a desalination facility.



Desalination Project

- The City commissioned a study of possible brackish water sources ranging from 20 miles south of Alamogordo to 30 miles north of Alamogordo.
- Four piloting sites were selected within the study area.
- Ultimately the Snake Tank Well Field was selected – 26 miles north of the City.
 - Availability of unappropriated brackish groundwater
 - Large quantity of groundwater in storage
 - Relatively even and acceptable brackish water quality
 - Opportunity to gravity flow to treatment plant
 - Outside the Tularosa Basin Administrative Criteria area





Permitting

In September 2000, the City filed application T-3825 *et al.* with the New Mexico Office of the State Engineer (OSE) seeking a new appropriation of 10,000 AFY of brackish groundwater from ten wells in the Snake Tank field.

- In January 2010, the City finally secured rights to 4,000 AFY of brackish groundwater at the Snake Tank Well Field.

During the nearly 10 years the city pursued the groundwater rights for the Snake Tank Well Field, the city continued to address potable water issues:

- Expanding the use of treated effluent water to irrigate public grounds including school district fields.
- Rebuilding and increasing the efficiency of existing groundwater wells.
- Actively promoting water conservation through public meetings, monthly newsletters and active enforcement of conservation ordinances.
- Updating the City's 40 Year Water Plan.
- Adding storage capacity to maximize surface water collection when available.



Desalination Facility

- Originally planned to be located on state land near the Snake Tank Well field.
- Now planned to be located across LaVelle Rd. from the Brackish Groundwater National Desalination Research Facility.
- Based on actual field testing, the City estimates an RO recovery of about 80% with blending of untreated water with permeate in an appropriate ratio to achieve potable water of about 800 mg/l TDS.
- Will be constructed in stages to phase capital costs.
- At final build-out capacity is estimated to be 2.8 million gallons per day of potable water.
- The plant is intended to be a “peaking” facility, or drought reserve, when surface flows and existing groundwater is insufficient to meet the city’s growing needs.



NEPA

Because the Snake Tank Well Field, portions of the pipeline and related infrastructure are on federal lands managed by the U.S. Bureau of Land Management (BLM), an Environmental Impact Statement (“EIS”) is required.

In May 2004, the City entered into a contract with a consulting firm which, at the direction of BLM, prepared the EIS. As the City was not a co-lead, its only role in the preparation of the EIS was to ensure that the project description was correct and to pay the consultant. To date, the City has paid over \$1,000,000 for the work on the EIS.

A Record of Decision (ROD) was issued in favor of the City by the BLM in the Summer of 2012.



Conclusion

The City of Alamogordo's new desalination project will cost an estimated \$54 million to provide an independent and reliable water supply. The project is not only important to the City, but also to the region and the continued viability of Holloman Air Force Base. The City's desalination project is expected to work conjunctively with the Tularosa Basin National Desalination Research Facility in equipping the City's plant and using next generation products and advances in desalination technology. The desalination facility also has the potential to be used by other regional entities in need of commercial, industrial, and municipal water supplies.

The City has received funding (WTB #80) for the first 15 miles of water transmission pipeline from the Snake Tank field to the City and is currently in discussion with Holloman Air Force Base on co-use of the Bonito Lake transmission pipeline for brackish water which would alleviate, in the short term, the need for approximately 13 miles of new pipeline. The City has also received two loans from the NMFA to permit, design and construct an interim 1 MGD desalination plant.

The most pressing issues the City faces in moving forward to make the desalination facility a reality is the completion of the NMED permitting process and funding assistance to complete the construction phase of this project.