

## Potter County Well Field Development

West Texas

### Client

City of Amarillo

### Highlights

- ◆ 2011 National Ground Water Association Award for Outstanding Ground Water Supply Project
- ◆ Multi-year, multi-phase project

DBS&A was retained by the City of Amarillo, Texas to develop new water supplies from its Potter County water rights holdings to meet future growth needs and address near-term supply shortfalls due to the effects of drought on surface water supplies. The City's goal was to produce an additional 20 to 40 million gallons per day (mgd) of supply from approximately 45,000 acres of water rights holdings within the Northern Panhandle High Plains Aquifer, composed primarily of the Ogallala Formation. Key components of the project include:

- ◆ Hydrogeologic assessment
- ◆ Drilling contract procurement and administration
- ◆ Regulatory permitting
- ◆ Exploratory borehole drilling
- ◆ Supply well engineering design and construction oversight
- ◆ Aquifer testing and well performance assessment
- ◆ Well field optimization modeling

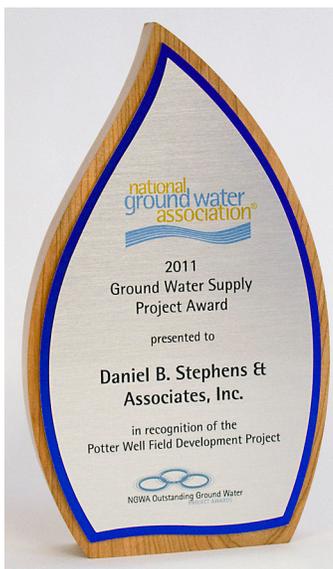


Optimal sites for the initial prototype well installations were based on a 3D hydrostratigraphic model.

Phase 1 activities of the multi-year project were successfully completed in 2008. Initial hydrogeologic assessments

included evaluation of geophysical logs and driller's logs from previous test drilling and well installations throughout the area of interest. Subsurface lithology and stratigraphy were incorporated into a 3D hydrostratigraphic model by using Earth Volumetric Studio software. The model was then used to select optimal sites for the initial prototype well installations based on aggregate thickness of sand and gravel layers and the geometry of the underlying Permian red beds.

Additional hydrogeologic assessments included groundwater modeling of the area of interest. DBS&A updated and modified the Texas Water Development Board's Northern Ogallala Groundwater Availability Model (GAM) to conduct production scenario simulations. This modeling study demonstrated that the initial plans for producing 20 mgd from a limited portion of the City's water right's holdings would result in excessive drawdown. DBS&A advised the City to expand the area of development to obtain the required production capacity.



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Prototype supply wells demonstrated production capacities ranging from 850 to 1,140 gallons per minute.

During the summer of 2008 DBS&A planned, designed, and oversaw installation of four prototype supply wells 490 to 900 feet in depth and conducted pump testing that demonstrated production capacities of 850 to 1,140 gallons per minute. The field program also included the installation of 5 observation wells used to monitor water level drawdown during pumping tests and drilling 10 exploratory test borings to depths up to 960 feet.

DBS&A updated the groundwater model based on the Phase 1 results and performed additional simulations to determine the final well field design of 21 supply wells within a 18 square mile footprint.

DBS&A planned and oversaw the drilling of 11 additional exploratory test borings in the spring of 2009 to verify site suitability for the selected well sites and provide site specific data for well design. On behalf of the City, DBS&A prepared and submitted a Multiple Water Well Drilling Permit application to the Panhandle

Groundwater Conservation District (PGCD). Additional modeling scenarios were run at the request of the PGCD to demonstrate predicted aquifer impacts from balancing future production demand between the new Potter County well field and the City's existing Carson County well field under most-likely case and worst-case future pumping demand scenarios. DBS&A's work with PGCD resulted in the approval of a new permit to drill 17 new wells, completing the well field with a permitted production ceiling of 24,900 acre-feet per year, or more that 22 mgd from a contiguous tract of nearly 41,000 acres.

DBS&A's laboratory performed sieve analyses on soil samples from the new test drilling and on archived samples from previous test drilling. Utilizing these test results, DBS&A prepared detailed designs for 17 new supply wells with 16-inch diameter casing and screens ranging in depth from 460 to 700 feet.

DBS&A prepared plans and specifications for well construction, testing and regulatory reporting to be completed within 160 days using multiple drilling rigs, development rigs, and pumping crews.

Phase 2 construction activities began in July 2010, and the installation and testing of 16 supply wells and six monitor wells was completed the same year under budget and two months ahead of schedule.

