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## BETTER THAN THEY FOUND IT

Pennsylvania utility emphasizes longevity  
and takes a proactive approach  
to system setup and maintenance

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Jeremy Trout  
Public Works Director  
Windsor Township, Pennsylvania





# A COMMUNITY THAT WILL LAST

Pueblo of Acoma Utility Authority stretches limited resources to bridge historic past with a more modern future

By *Peter Kenter*

**T**he Acoma Pueblo tribe of New Mexico has occupied the same land for more than 800 years, possibly as many as 2,000. While the word “Acoma” has many possible meanings, some tribal elders believe it means “a place that always was.”

The Pueblo of Acoma Utility Authority Water & Wastewater Department ensures that the community enjoys all of the benefits that modern technology offers, while respecting that long tribal history.

The community of about 5,000 is made up of several villages: Sky City (Old Acoma), Acomita,

Anzac, Skyline and McCarty’s. An appointed tribal administration and tribal council oversee the Pueblo. The population is relatively stable and the Pueblo’s economy benefits primarily from agriculture and tourism, rather than an industrial base.

The Acoma Pueblo tribe is a federally recognized tribal entity. Tribal governance is apparent in many aspects of utility operations. For example, tribal “ditch bosses” oversee the use of water for irrigation and gardens. In certain cases, the utility can benefit from grants or low-interest loans that are available to government-recognized tribes. The Pueblo of Acoma Historic Preservation Office

oversees all construction projects to ensure they exist side by side with a rich historic and cultural heritage (see sidebar).

Arvind Patel is the utility department director. With a background in environmental engineering, he came to Pueblo of Acoma in 2005 on a two-year contract to help clean up illegal solid-waste dump sites in the area. “I was able to secure a grant from the New Mexico Environment Department’s Recycling and Illegal Dumping Act Grant to recycle tires and use the crumb rubber to build the surface of a running track for the community,” he says.

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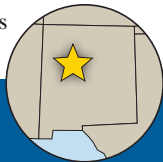


**Left: Water and wastewater department employees excavate a water main to add new connections for nearby homes. Right: Limbert Martinez uses a Wacker Neuson soil compactor near a newly installed septic tank at a new office in the Pueblo of Acoma.**



## The utility is formed

The project impressed the tribal council, and Patel was hired on as



### PROFILE:

## The Pueblo of Acoma (New Mexico) Utility Authority Water & Wastewater Department

**YEAR ESTABLISHED:**  
Circa 1940

**POPULATION SERVED:**  
910 accounts/4,200 customers

**AREA SERVED:**  
27 square miles

**DEPARTMENT STAFF:**  
7

**INFRASTRUCTURE:**  
Sewer, 15 miles; water, 70 miles

**ANNUAL DEPARTMENT OPERATING BUDGET:**  
Approximately \$660,000

**ASSOCIATIONS:**  
New Mexico Water and Wastewater Association

**WEBSITE:**  
[puebloofacoma.org/Water\\_and\\_Waste\\_Water.aspx](http://puebloofacoma.org/Water_and_Waste_Water.aspx)

tribal engineer in 2008. He became the water and wastewater director in 2010 when the department began receiving dedicated and separate funding.

"Prior to water and wastewater forming its own department, Public Works handled almost every physical asset from water and sewer to windmills and maintaining fences for the ranching community," Patel says. "At the time the department was formed, we started from scratch with myself, three other people in operations and maintenance and all of the knowledge they had in their heads about the system. Our first priority was asset management, and we went out and bought a GPS system, mapping all valves, hydrants and underground infrastructure using Esri GIS mapping software. We then married those to historic archival material, and now have digital maps for all underground infrastructure."

Until August 2014, there were no fees charged for either water or wastewater services — these were 100 percent subsidized out of the pueblo's revenues. "We enacted utility rates along with educating the public about the advantages of devoting additional resources to maintain and improve the system and to create a reserve fund," Patel says.

Water is pumped from groundwater sources in the area's sandstone aquifers. The water is treated with chlorine and SeaQuest (Aqua Smart Inc.), a chemical containing ortho- and polyphosphates that binds high levels of iron, manganese and hardness found in area water so they don't particulate (fall out of solution) and scale on interior pipe walls.

The 70 miles of water pipe range from 2 to 12 inches in diameter and materials run the gamut from galvanized steel to asbestos cement, ductile iron and PVC. Most new construction employs PVC, either C900 or Schedule 40.

"Some parts of the system are up to 60 years old," Patel says. "When the utility was formed we would have breaks quite often, up to several a month. We were spending more time fixing the breaks than doing preventive maintenance."

One of the reasons for leaks is that the water system is spread out across widely varying hydraulic zones.

## Putting valves on automatic

"Back then, operators had to open and close valves manually rather than have the pressure controlled through pressure release valves," Patel says. "Without having a complete picture of the entire system, this created a lot of pressure surges. We now have a floating system with PRVs, and the only time we manually switch the valves is when we exercise them."

The utility has initiated a hydrant flushing program and has been monitoring pressure at various locations where repairs were turning into "Band-Aids on Band-Aids." These pipes are being prioritized for replacement.

"After several years of repairs, creating a floating system, installing PRVs, and several pipe replacement projects, we're finally on top of it, doing preventive maintenance and getting ahead,"

*(continued)*





Pueblo of Acoma Utility Authority employees (from left) Arvind Patel, Marc Jaure, Lloyd Shutiva and Raymond Abeita.

## DESIGNED WITH TRADITION IN MIND

The Pueblo of Acoma's Sky City, also known as the Old Acoma Village, is an ancient Native American ancestral village built on top of a 400-foot mesa, the home of what is possibly the oldest continuously settled community in the country.

Sky City aims for tradition and authenticity, but it's also a popular tourist destination. When the community elders requested a new washroom facility for guests, they turned to the Pueblo of Acoma Utility Authority Water & Wastewater Department to craft a solution that would combine modern technology with a noninvasive approach to heritage.

"In the interests of heritage, there are no water or sewer utilities up in the old village," says department director Arvind Patel. "The request put to us was to create clean and sanitary washroom facilities for as many as 100,000 visitors per year while still preserving both the aesthetic and historical nature of Sky City."

With the assistance of Advanced Composting Systems LLC, the department developed an off-grid washroom facility that relied entirely on rooftop solar panels for its lighting.

"These washroom facilities are 100 percent off-grid waterless composting restroom buildings," Patel says.

The 12-building washroom facility with 71 individual stalls and two showers was built with grants from the EPA, Indian Health Service and the State of New Mexico totaling about \$3 million. The facility is accessed from a second-floor skyway extending from the mesa. That allows generous space for the composting facility on the base level, which takes up about two-thirds of the height of the building.

"It was designed with an exterior that gives it a traditional stucco look," Patel says. "It was a great wastewater solution that respects tradition and preserves the Historic Preservation status."

Patel says. "We experienced only one break over the entire winter last year."

### A newer sewer system

The 15 miles of sewer line is composed of clay and PVC.

"The sewer system was put in over the past few decades, so there are not a lot of issues, except some root intrusion," Patel says.

About half the community is still served by individual septic systems. While the sewer system continues to slowly expand, construction is problematic because in many areas crews have to dig through hard rock to lay new pipe.

"In other areas, complicated elevations make it difficult to engineer proper gravity flows," Patel says. "For now it's more efficient for us to offer septic pumping as part of our utility service."

The utility currently operates one septic truck — an International with a 3,500-gallon tank by Lely Tank, outfitted with a 3,500 psi jetter.

The utility performs repairs on both water and sewer pipes, up to complete full-circle breaks and pipe replacement. The crew also replaces hydrants and components and handles other repairs. Larger construction projects are contracted out.





Lloyd Shutiva collects a sludge sample from the Pueblo of Acoma wastewater treatment plant.

### Bringing maintenance in-house

Currently, the utility hires a third party for sewer line maintenance, but that function is being brought in-house this year.

"We're looking to obtain a Vactor 2100 in late 2016," says Patel. "We're also looking at buying a sewer line camera. That will really expand our capabilities."

Wastewater treatment is provided courtesy of two lagoon systems and a sequencing batch reactor activated sludge plant.

"As a small utility we're always looking for efficient ways to stretch our resources," Patel says. "We prioritize our needs. The SBR system runs largely through automation, but instead of buying expensive automated effluent testing equip-

ment we manually conduct three field tests for ammonia, nitrates and 30-minute settleability. Using those three simple tests we can make any adjustment we require and ensure we don't exceed our permits. We're not spending taxpayer money on expensive equipment we don't really need to perform process control testing."

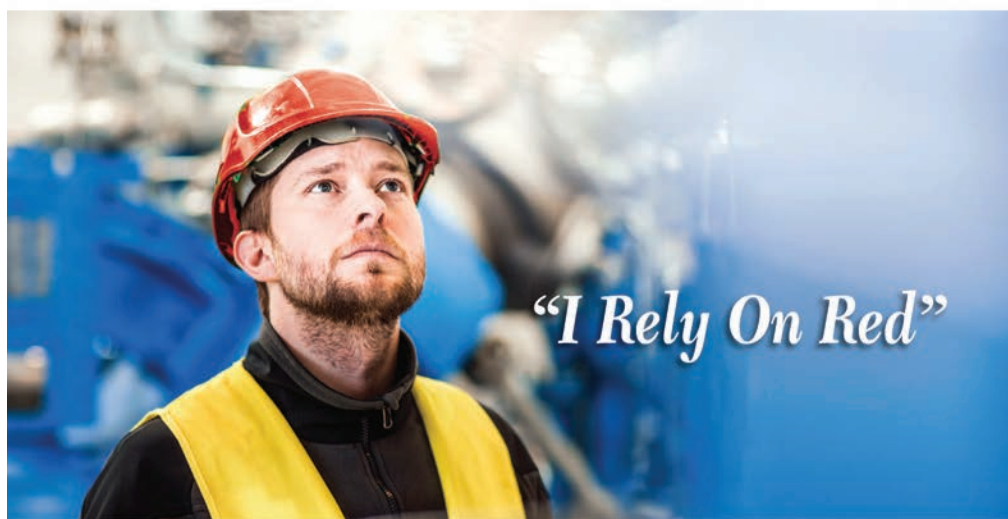
Despite its limited resources, the utility has achieved professional recognition. At the 2015 New Mexico Water and Wastewater Association award ceremony held earlier this year, the utility took home both the Water System of the Year

award and the Max Summerlot Award for wastewater treatment. Employees also took home two of four Operator of the Year awards: Jessie Padilla for wastewater operator and Marc Juarez for water.

"We may be a small utility but we take our responsibilities seriously," Patel says. "At the end of the day that means quality drinking water and an effective wastewater system. By also promoting conservation and efficiency, we can ensure that the future generation of the Pueblo of Acoma will inherit a self-sustaining system that protects both cultural resources and quality of life." ♦

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