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City of Santa Barbara Fights Drought by Upgrading Mobile GIS Workflow

The City of Santa Barbara, located roughly 90 miles north of Los Angeles, supplies water to approximately 95,000 residents. With California's unique drought conditions, state water suppliers face challenges surrounding conservation, water-loss prevention, and system maintenance. The city wanted high-quality asset data for responding to fluctuating drought conditions.

In 2014, Santa Barbara decided to optimize its water system by establishing a goal to replace all 27,500 water meters within five years.

"Instead of just doing a regular meter replacement based on age, we decided to handle this task comprehensively to set ourselves up for the future," said Theresa Lancy, water distribution supervisor at the City of Santa Barbara.

A Slow Legacy Field Data Collection Workflow

While replacing water meters, the city wanted to collect the new meters' locations with high accuracy.

In the past, the legacy mobile app that staff were using without a GPS did not allow them to locate individual meters. Meters were instead correlated with a parcel.

"We used the parcel number for a general idea of location," Lancy said. "But in circumstances where multiple meters are located on a single parcel, knowing which meter was associated with a particular location was especially difficult."

Since meters often sat within one foot of each other, Lancy and her team wanted a higher level of accuracy. As a proof of concept, they borrowed a GPS receiver from a sister department.

This equipment used a mobile base station to provide differential corrections, but the station needed to be manually set up and broken down on every trip. This took an hour of fieldwork every day,

slowing down the meter location collection. In 2018, the City of Santa Barbara looked for a faster data collection workflow.
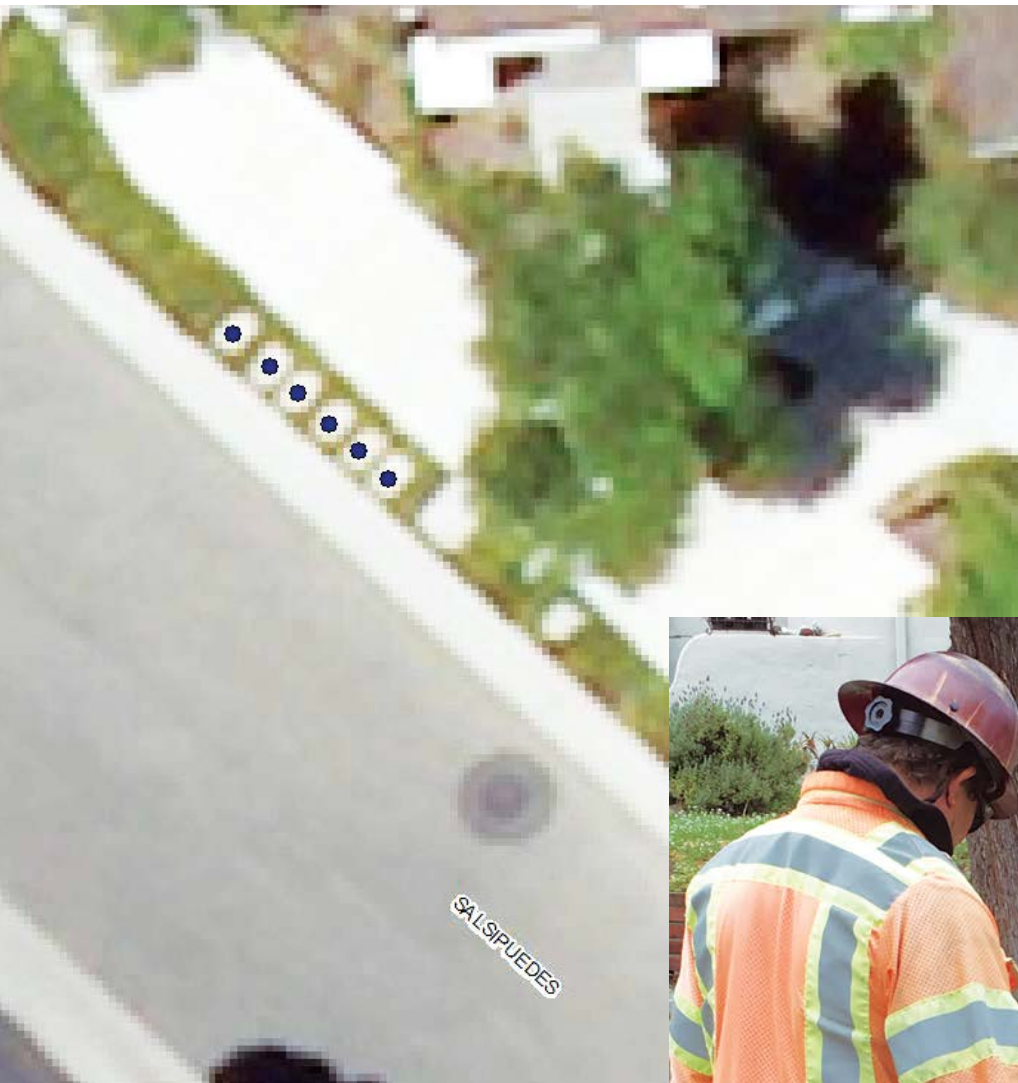
Moving to a Faster Field Data Collection Workflow

Since the city was already using the Esri platform, Lancy and her team chose Collector for ArcGIS as their new mobile app. Collector established accuracy thresholds, while ArcGIS Online let multiple employees edit and utilize the updated web maps simultaneously.

The next step was to find a GPS receiver that was compatible with Collector. An employee suggested the Arrow Gold GNSS receiver from Esri partner Eos Positioning Systems. The Arrow Gold receiver provided centimeter accuracy and was also compatible with iOS devices the city already owned.

The only missing piece was the source of real-time kinematic (RTK) corrections.

Initially, the team connected the Arrow Gold receiver to a base station 19 miles away. This base station was expected to provide centimeter-level accuracy, but it proved outdated and challenging to connect to.

Next, the team instead opted to install another Arrow Gold receiver as a permanent base station on the roof of the distribution building.

"Because the cost and effort involved was fairly minimal, it just made a lot more sense to go ahead and set up our own base station," Lancy said. "We also thought there could be other groups in the city that would use this system."

↑ Black points in ArcGIS Online represent meters. With Collector for ArcGIS and the Eos Arrow Gold GNSS receiver, meters that share a parcel can now be individually mapped down to the centimeter.

→ Santa Barbara fieldworkers use the Eos Arrow Gold receiver with Esri's Collector to map a water main.
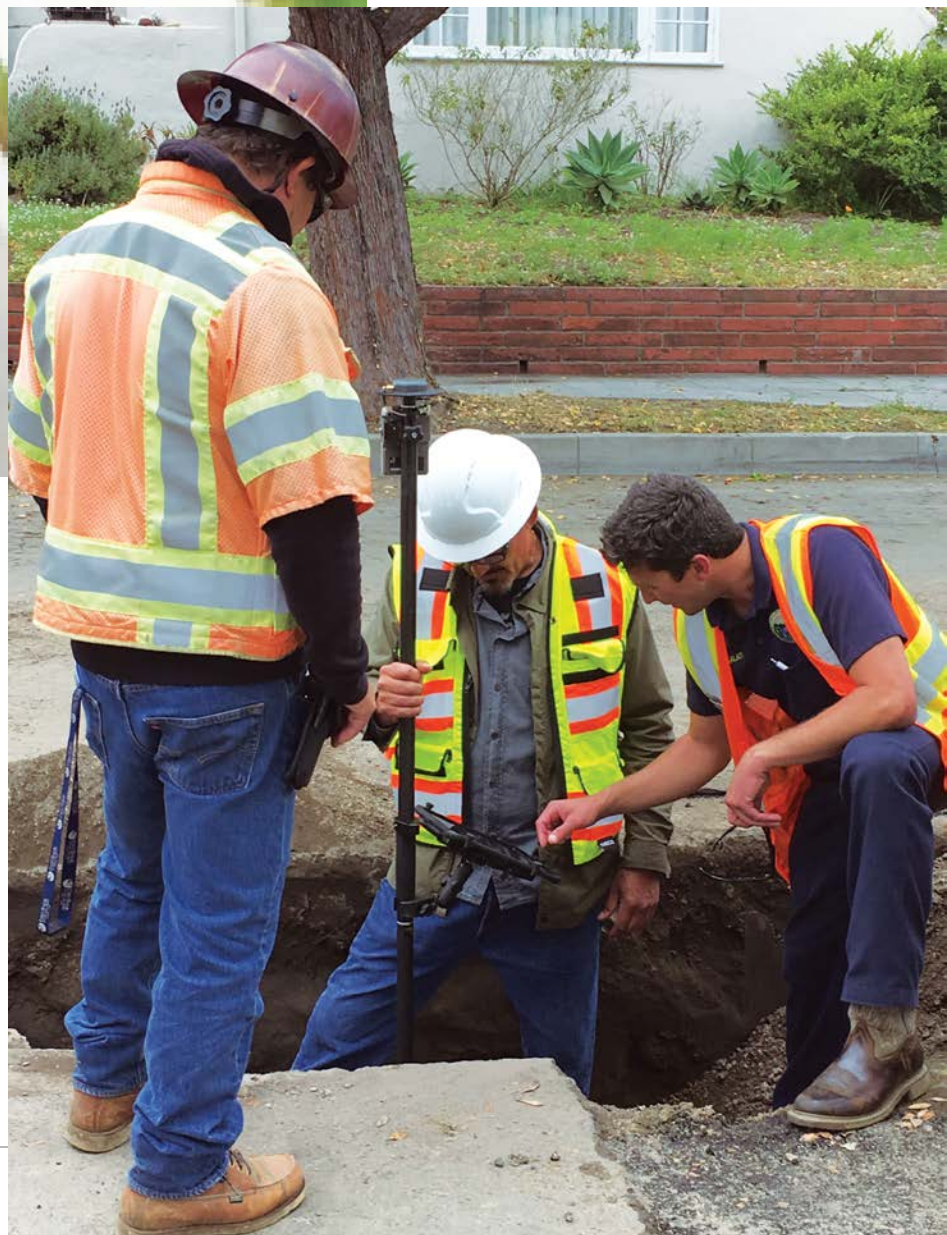
Locating Meters Quickly and Efficiently

Since adopting the new solution, Santa Barbara doubled its rate of meter-location collection. Field crews no longer spend an hour per day setting up and dismantling the temporary base station. Now, they are ahead of schedule in meeting their initial goals.

Moreover, installed assets are recorded with centimeter accuracy, using the Arrow Gold receiver and Collector, meaning individual meters formerly sharing a parcel can now be uniquely identified. The city has mapped 75 percent of its water meters. This information will

be vital to future efforts to implement automated metering.

Customers have already benefited from faster repairs and increased water conservation.

Because the Collector/Arrow Gold setup is so user-friendly, field crews have been able to expand their project scope. For instance, crews now map new hydrant and valve installations.

"Once we got the product and started using it, we realized how to expand the use of the Arrow Gold [receiver] and Collector for other applications," Lancy said.

In 2018, the city established a new goal: to replace 2 percent of its 300

water-main miles per year. With all the upgrades, the city expects to be better prepared to fight drought.

"Drought conditions certainly challenge municipalities like ours," Lancy said. "Efficiently maintaining our system is vital. Leaks need to be located quickly and addressed promptly. Having the right tools to identify, locate, and document repairs means better customer service and reliability—which are very important to us."

GPS Meter Project Progress
- Completed
- In Progress
- Upcoming
- Not Completed
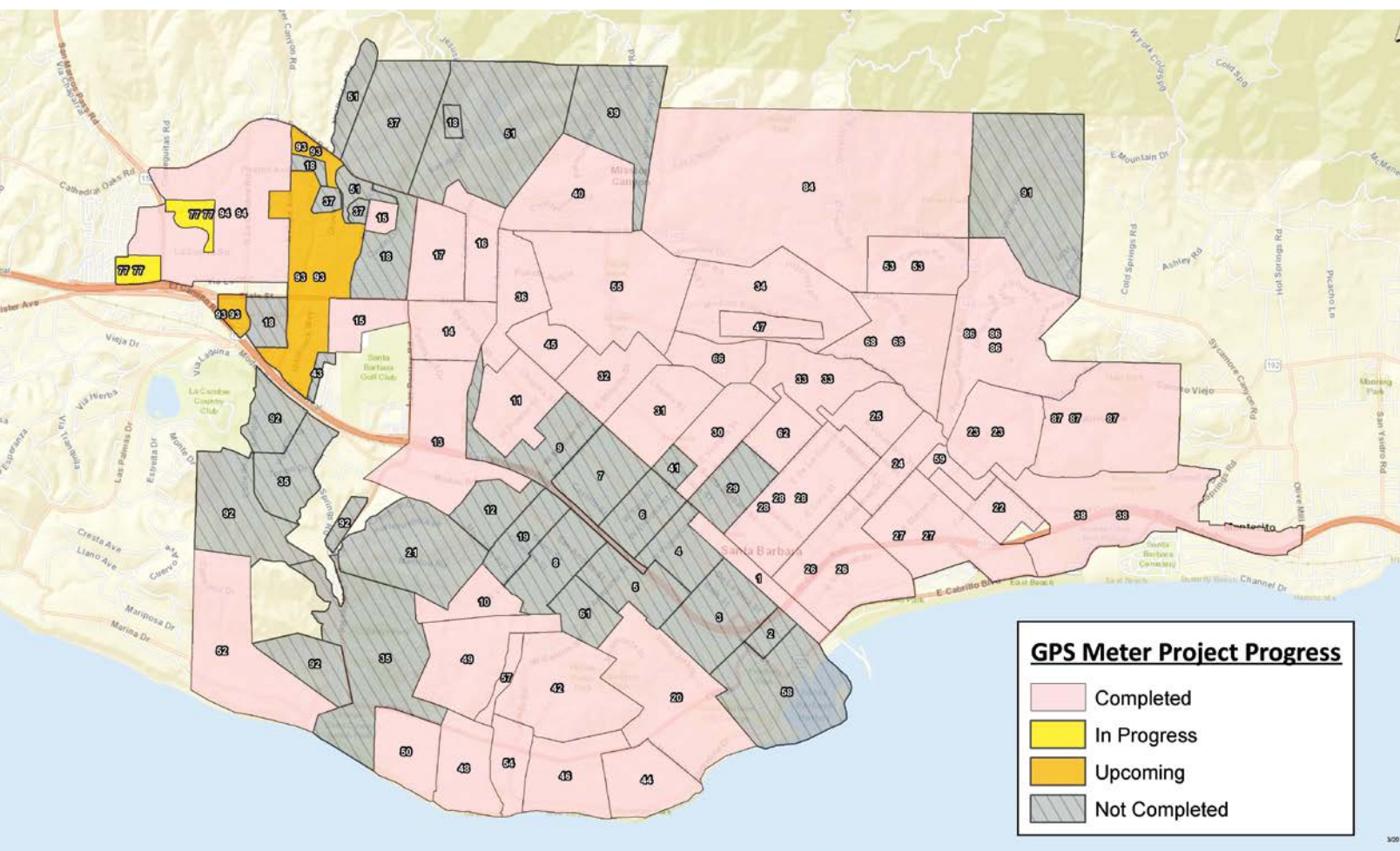
↑ Pink polygons represent zones with all meters mapped. The gray areas represent unmapped zones.