



Size  
4,500  
manholes



Location  
Minnesota,  
USA



Industry  
Civil  
Engineering



Scanned  
Sewer pipe  
network

## Frontier Precision

Public works and energy utilities are continually looking for new ways to protect the safety of their personnel in the field. With the help of the GeoSLAM ZEB Revo mobile laser scanner and the specially designed GeoSLAM Cradle, the cramped and hazardous spaces in manholes can now be captured in 3D without putting field workers at risk.

“An engineering survey firm scanned the interiors of 4,500 manholes with the ZEB Revo for a Minnesota municipality,” said Dustin Harr, Geospatial Representative at Frontier Precision, a GeoSLAM dealer.

What lies beneath the manhole covers found in nearly every city and town varies considerably. Some are access points to extensive stormwater and sewer pipe networks. Others are entries into utility conduits through which water mains and electric lines are run. A few manholes are simply tight underground spaces where key pieces of municipal infrastructure reside.

Regardless of their function, manholes and the assets they contain are difficult and sometimes hazardous to map. Not only are the interior spaces dark, dirty, confined and usually wet, they

pose potential risks related to cave-ins, poor ventilation and rodent infestations. Above ground, the manhole access points are often in the middle of busy streets requiring set-up of a cone zone to try and protect workers from passing traffic.

**“ You capture the data you need for one job and then have information someone else might need for another without a second site visit. ”**

This combination of hazards compels workers to spend as little time inside the manhole as possible, explained Harr. As a result, they have traditionally captured only the measurements they need for the project at hand – usually with a surveying level rod.





One of the most common applications is measuring the elevations of pipe inverts to map a water supply or drainage network in preparation for system expansion or maintenance. Personal hazards aside, making accurate asset measurements in a tight underground space with a long level rod can be challenging.

Frontier Precision's clients are increasingly turning to the ZEB Revo for these jobs because the handheld laser scanner is fast, accurate, and captures comprehensive point clouds. Most importantly, it keeps personnel out of harm's way. Favored for manhole environments because of its high IP rating, which means it can be used in dirty and wet conditions, the ZEB Revo can be lowered into the underground space with the GeoSLAM Cradle.

In just a few minutes, the lightweight device can capture 360-degree scans inside the space regardless of available lighting. Even if the assets being surveyed are offset from the opening or several meters down tunnels, the ZEB Revo captures the 3D scan data needed to generate an accurate point cloud of the subsurface space.

"The first benefit of laser scanning [in manholes] is safety. The second is you collect a very comprehensive and complete data set," said Harr. "You capture the data you need for one job and then have information someone else [in the organization] might need for another...without a second site visit."

