



Vertebrae Under a Dispenser Island: Installation Cost Comparison

SITE

Convenience Store Facility, Pensacola, FL

CONTAMINATION

Gasoline Range Organics in ground water

BACKGROUND

A known release of gasoline fuel at this facility led to ground water contamination. Although a relatively small site, horizontal wells using Vertebrae™ technology were chosen for installation. A full scale implementation was completed and the speed of installation and sampling capabilities of Vertebrae were observed.

SPOILER PHOTO

The real success story of this case study is best described using a picture. This picture represents our work both while drilling and while sampling the source area under the canopy by technicians.



Can't find the drill rig? Can't find the sampling truck and technician? They are off to the side of the site, just beyond the billboard, safely tucked away, completely out of the way, right where the owner prefers them.

INSTALLATION COST COMPARISON (CONVENTIONAL WELLS VS. VERTEBRAE WELL SYSTEM)

At this site, and most sites, one realizes traditional trenching will be very disruptive to business activities due to trenching on both sides of the dispensers. Furthermore, the C-Stores in this area are open late and therefore performing the work at night would not be a suitable option. But for the sake of comparison, the costs of traditional trenching and vertical wells was estimated.

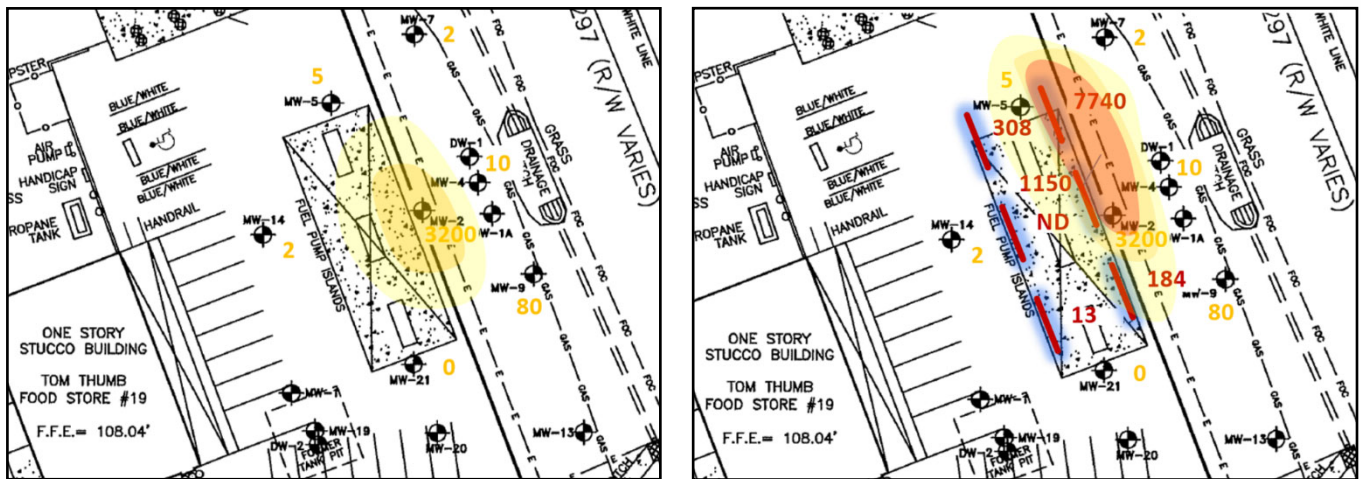
	Mobilization	Drilling/Wells	Trenching	Time	Oversight	Total Cost
Conventional	\$1,500	\$3,500	\$28,800	7-10 days	\$7,500	\$41,300
Vertebrae	\$1,000	\$36,500	included	2 days	\$2,500	\$40,000

Cost assumptions: There are 6 wells in the network. Two home runs are used for trenching them back to the system location. The cost for trenching is \$90 per linear foot. Well costs are derived directly from the Florida preapproval template. Oversight is \$1000 per day. Vertebrae™ are installed in one mobilization. No markup is included.

REMARKABLY THE CALCULATED COST INDICATES A COST SAVINGS TO THE CLIENT, BEFORE WE EVEN CONSIDER THE LACK OF BUSINESS DISRUPTION AND HORIZONTAL WELL EFFECTIVENESS BENEFITS.

SUMMARY OF ACTIVITIES

- The Vertebrae Installation was completed in January 2017.
- The drilling went under the canopy, the entire dispenser area, and under both busy entrance/exits. Business disruption was eliminated. In fact, due to people's familiarity of HDD for utility work, most patrons were completely unaware any work was being completed at the site, let alone environmental work.
- **The lightning fast installation of the wells took 2 days and saved more than half the time of conventional technologies (estimated to take 1-2 weeks).**
- The Vertebrae Well segments were sampled to further characterize the hydrocarbon plume. Results from the wells under the canopy added further definition and indicated concentrations were more significant than previously characterized.



ARE VERTEBRAE WELL SYSTEMS THE SAME AS TRADITIONAL HORIZONTAL REMEDIATION WELLS?

ABSOLUTELY NOT, THE DIFFERENCES ARE CLEAR AND INCREDIBLE.

1. SAMPLING AND CHARACTERIZATION

With discrete wells screens (with customizable lengths and adjustable levels of discreteness), the segments allow sampling. This data can be collected anywhere, often under objects formerly considered inaccessible.

2. CONTROL OVER PREFERENTIAL PATHWAYS

One drawback of traditional horizontal remediation wells is that there is the possibility of a lack of 'uneven' coverage. That is, there is a chance, despite design efforts, for a preferential pathway, sand lenses, or other channeling effects to cause uneven treatment. However, with Vertebrae Well Systems, this possibility is eliminated with individual well control. In this installation there are three 'well screens' (20 ft segments) instead of one 80 ft well.

3. ADJUSTMENT TO MATCH THE CHANGES OVER TIME.

When the plume responds from treatment, attenuation, or seasonal effects, the Vertebrae Well System allows sampling to understand these changes and adaptation to continue the proper strategic treatment.

CONCLUSION

Vertebrae™ is a better solution than conventional wells and provides data gap coverage other wells can't. It's a necessary tool for most sites. It provides more contact with the plume, minimizes or eliminates business disruptions, and removes unsightly well vaults, all while being twice as fast, safer and cost effective.