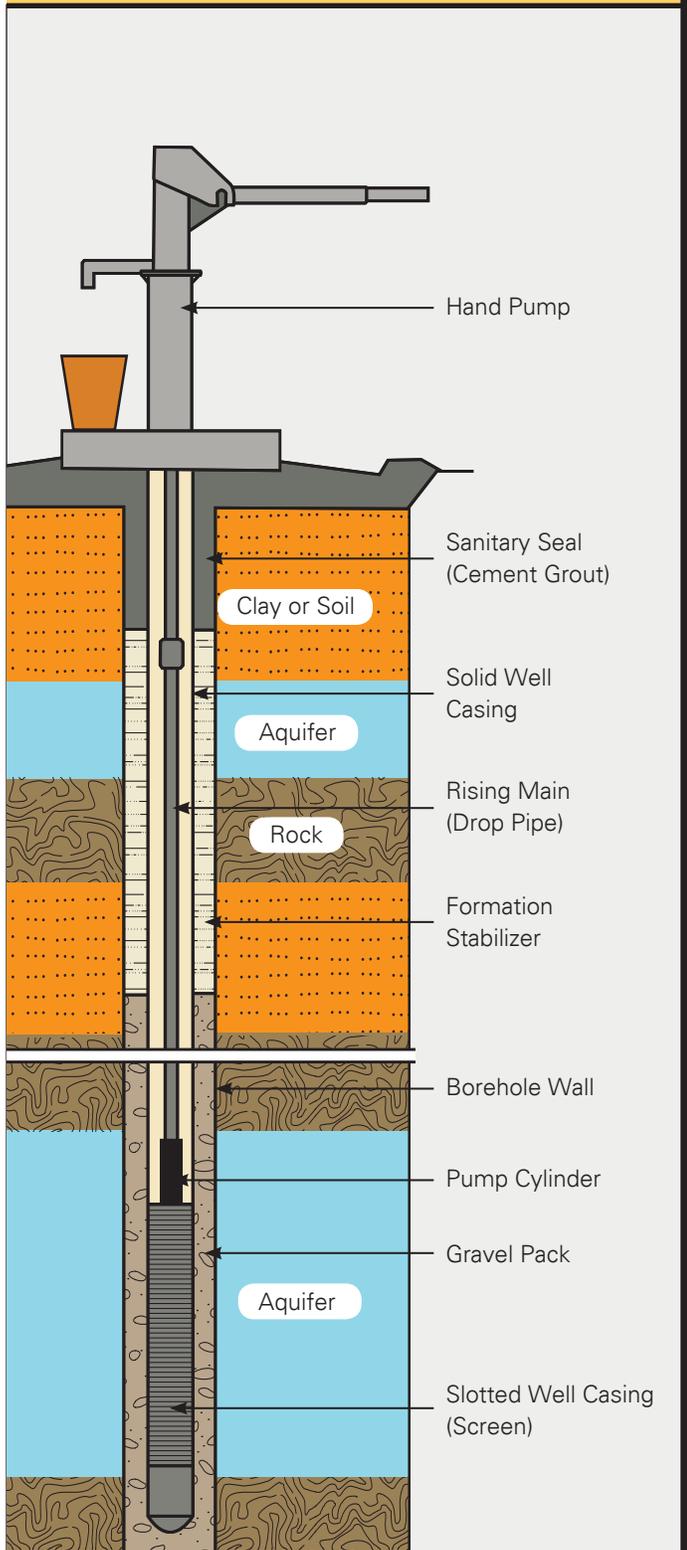




A CLOSER LOOK:

HOW WELLS WORK

INSIDE A WELL



You know about the global water crisis. You've seen photos of kids drinking out of streams and mud holes—and you've seen them drinking water out of hand pumps after a new well is drilled in their village. But what does that shiny new pump mean for these kids and their community? Are wells like this really the best solution? How do they work? Are they sustainable? Are wells sucking up all the water? Are water wells a cookie-cutter solution that aid workers simply copy-and-paste from one community to another?

Read on. We'll try to answer your questions.

Wells aren't the only clean water solution; however, they're one of the most common. The vast majority of water projects undertaken by Living Water International teams are water wells—and for good reason: in most parts of the world, clean water can be found under your feet, in underground layers called aquifers. These layers are continually refilled by rain and other surface water that filters down through the earth. Water in aquifers is usually very clean; sand and porous rocks provide a natural purification system, filtering out sediment and bacteria.

SO WHAT'S A WELL?

A well is simply a hole in the ground that reaches down to an aquifer. Traditionally, people in the developing world have dug wells by hand, which means that only the shallowest aquifers can be reached; hand-dug wells rarely exceed 50 feet, and are often left open, allowing run-off water and other contaminants to enter the well from the surface. The shallow aquifers that these wells draw from are vulnerable to pollution from agricultural fertilizers, industrial waste, or seepage from nearby latrines.

With the right equipment, wells can be drilled to deeper, safer water. A pipe and a pump are used to pull water out of the ground, and a screen filters out any particles. Drilled wells are lined with PVC or galvanized steel to protect them from pollution that could otherwise seep in. They are sealed systems, with pumps that only allow water to flow out of the hole, to prevent contaminants from being introduced from the surface.

OKAY... HOW DOES IT WORK?

Wells come in different shapes and sizes, depending on the soil conditions and how much water is needed. In some areas, wells need to be very deep to reach good water—sometimes 1,500 feet or more—and require powerful electric pumps powered by diesel generators. These wells are drilled in large communities, and are often installed at a hospital or school. They can produce hundreds of thousands of gallons in a day and serve tens of thousands of people.

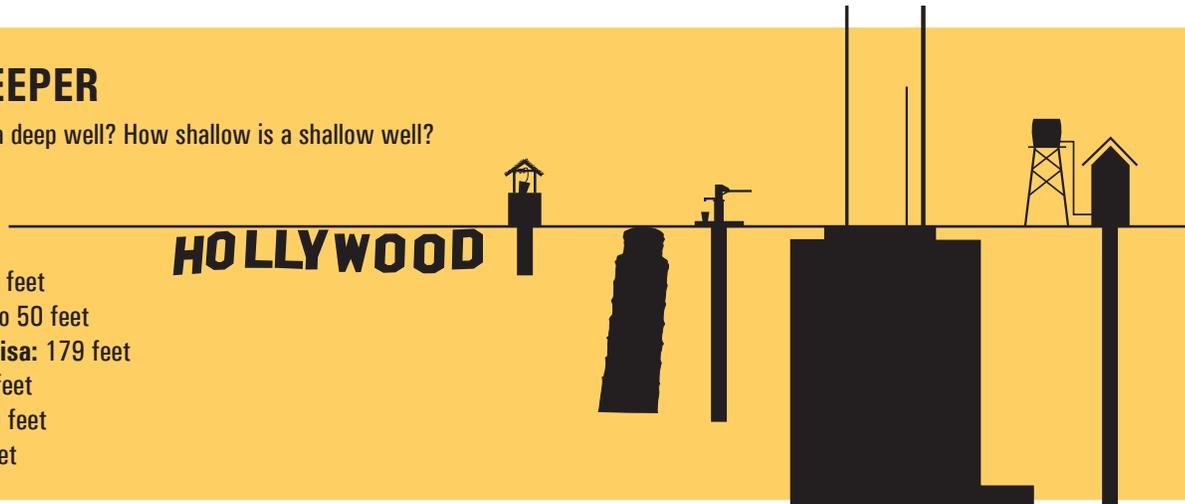
In the overwhelming majority of cases, wells don't need to be so deep; safe water is usually found within 100 feet of the surface. For a well like this, a manual hand pump can be installed. There are many kinds of hand pumps, some of which can pull

continued on back...

DIGGING DEEPER

Exactly how deep is a deep well? How shallow is a shallow well?

- Hollywood Sign:** 50 feet
- Hand-dug well:** Up to 50 feet
- Leaning Tower of Pisa:** 179 feet
- Shallow Well:** 200 feet
- Sears Tower:** 1,450 feet
- Deep Well:** 1,500 feet



water up from a depth of 200 feet. While not as convenient as an electric pump, a hand pump is usually a much more appropriate solution for a rural community, both culturally and technologically: hand pumps use common, easily-replaceable spare parts, and are simple for a village caretaker to maintain with minimal skills and few tools. Except for the occasional repair, it costs the community nothing to operate the well. Hand pumps are cost-effective, and the pumps used at LWI's wells are proven to be robust and reliable under field conditions. A single hand pump can easily provide water for a community of 500 people, but LWI teams regularly visit areas where two or three thousand people rely on one pump, and more wells are desperately needed.

Beyond the sustainability of the well, what about the water itself? News reports tell us that wells are pumping aquifers dry in India and parts of Africa. The thing to remember is that only a tiny percentage of water is used for human consumption. More than 70 percent of fresh water is used for agriculture and most of the rest for industry. Irrigation systems and factories operate on high-capacity water wells that run constantly, pulling millions of gallons daily. Water levels drop, sometimes causing shortage in surrounding residential areas. In contrast, the rate of flow on a village hand pump—about 5 gallons per minute—will never deplete a healthy aquifer. Using common sense in how we implement high-capacity drinking water projects and calling the industrial and agricultural sectors to be responsible water users will ensure plenty of

water for future generations.

HOW IS THE COMMUNITY INVOLVED?

When the time comes to decide on the appropriate solution in a particular village, the local community needs to lead the way. If a well is determined to be the best fix, the older members of the community are consulted on where the well should be placed; they often know where good wells were located generations before. In addition to finding the place most likely to produce good water, and placing it away from potential sources of contamination, the site of the well is important because the well is usually the social center of village life. If the well is not conveniently placed and conducive to social interaction, some people will continue to use their old watering holes. Many well-intentioned projects stand unused because a team of aid workers didn't bother to listen to the input of the intended beneficiaries.

At LWI, we are committed to being open to innovative techniques and technologies, but we are learning that the most innovative solution is collaborating with a community in a "low tech" but thoughtful answer. There's a lot of talk these days about creating "self-sustainability" as we approach community development projects. What if the answer isn't creating independence, but *interdependence*, as communities rely on one another to create and maintain the best solutions for the problems they face? What if, by starting by truly loving and listening to the people we came to serve, we could do something new—something with the distinct flavor of the Kingdom of God about it? 💧