

CONSALLEN

HAND DUG WELLS

HAND DUG WELLS

The hand dug wells method shown here was developed in Uganda to assist the long running Busoga Diocese Water and Sanitation Project in Uganda, in the construction of hand dug wells. It was aimed at improving the safety of workers excavating wells by hand, to give them the confidence to dig deeper and better wells. The one (right) shows the problem.

The method is a circular version of the standard civil engineering technique called 'close boarded excavation' widely used for hand dug shafts, trial pits and to investigate problems. The method can be undertaken with a very small initial outlay. It uses entirely locally made reusable tools and materials.



The low initial investment cost means that very small programmes can be entirely viable. No concrete shutters are required, and no lifting equipment.

Shaped block, brick and concrete ring lining can also be used with this method of safe working, but not illustrated here - ask for details. This method leads to economies in construction costs, since the permanent lining is not installed until after the well has been completed to depth, and a suitable quality and yield proven. Concrete rings can be installed in 'open hole' using this method, without risk of snagging on rocks, or running out of plumb. Most of the wells constructed by the Busoga project are brick lined; others are completed using a plastic borehole casing and back-filled with washed sand and selected excavated material.

Continued....

ALTERNATIVELY..

The last page of this presentation shows brief details of a light cable percussion drilling rig. This simple and inexpensive drilling machine will achieve in one day what hand digging may take 4 weeks to do - in any material, including cobbles & boulders. In addition to making finished boreholes, it can be employed as a means of prospecting for suitable hand dug well sites, allowing prior water sampling and avoiding large boulders. This ensures that a hand dug well in the same place will be entirely successful. The drilling method offers other useful attributes including bigger than normal borehole diameters in which buckets can be used.

Hand Dug Wells



The excavation is supported by the boards, wedged against steel rings using double wedges. This ensures the hole cannot collapse, but also allows the boards to be moved down as excavation proceeds. Movement of the boards in this way - one at a time, means that the workers are completely protected at all times. The boards shown were 4 metres long and supported by 3 rings.

At the start of a hole the boards protrude above ground, but as the hole is deepened both boards and rings are lowered to closely follow the excavation. Wedges are driven tight to ensure that each board is forced against the side of the excavation and will fully support all the ground against collapse. Boards are lowered one at a time as excavation proceeds, simply by slackening the wedges of that board only. With all other wedges in place and driven tight, the safety of the system can easily withstand the movement of a single board. In stable ground not all the boards are required.

Wedges are used in pairs. This ensures that flat faces are presented to both board and steel rings at each crossing point.

Wedges are tested for tightness at the start of each day's work, before anyone goes into the hole or stands on the rings.



In very unstable ground it will be necessary to ensure the minimum gap between adjacent boards, and that the boards provide full support up to ground level. Boards can be overlapped and used in a telescope fashion when full support is not required.

Hand Dug Wells



As noted above, one of the important attributes of the Method is the fact that it is a *temporary* support system that is entirely removed from the excavation on completion of back-filling.

Here the last of the boards is being removed and the rings & wedges can be seen in the foreground.

Below left:

After completing the well back-filling, it is time to dig out for the well-head foundation. Deep down-stands round the edge ensure that storm water will not undermine the protective slab that ensures the well remains free of pollution.

Steel reinforcement in the concrete ensures that the slab will not crack and again allow polluted water to percolate back into the well.



The finished job on the right is set for many years of use. Maintenance costs are low for the Consallen hand pump. This Ugandan installation has an average spares consumption of US \$2.40 per year.

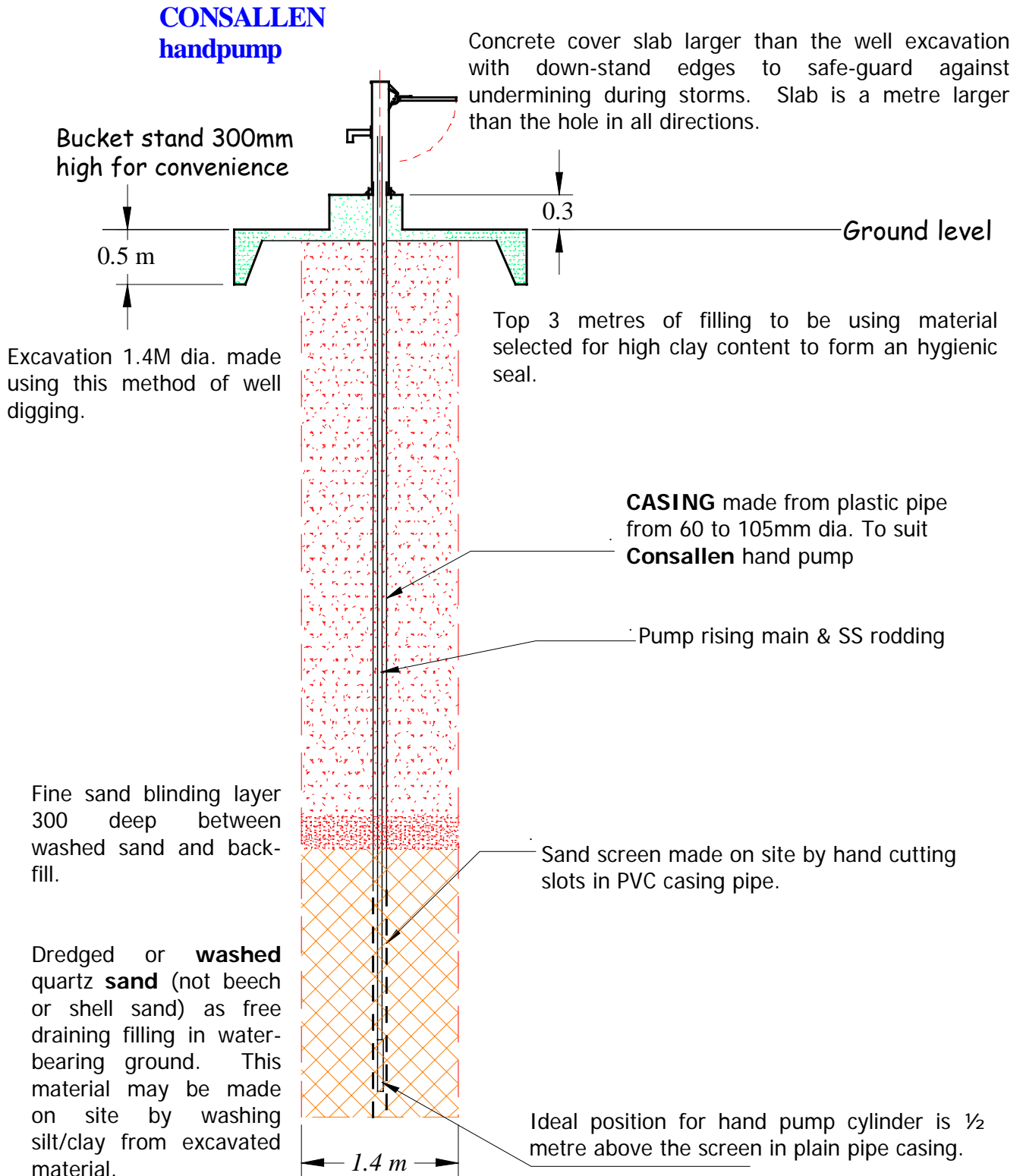
A maintenance technician visits and inspects the pump 3 times a year, and even if no spares are used, he is paid by the local water committee a fee of US \$3.00 per visit, the cost of which is shared by the 25 to 30 families who draw their water from this pump.

<http://www.consallen.com/handpumps/>



The

CASED WELL



Forager-55/1250 drilling rig

A Consallen Forager-55/1250 light Cable tool Percussion drilling rig working in the UK for a private water supply, with a two-man crew.

Used as a means of surveying for suitable sites for hand dug wells, This equipment saves cost, labour and disappointment in failed digging attempts.

The depth to water, absence of boulders and quality of water can be simply determined in advance of hand digging open wells.

Probing for places where boulders can be avoided is a practical use of this equipment, and the same attributes make it appropriate for other types of prospecting.

The Forager-55/1250 will install and recover temporary steel casing up to 10-inch (254mm) nominal bore, which is much bigger than most drilling methods can achieve.



Drilling and placing larger casing allows the installation of bigger than normal permanent plastic casing, in which cheap plastic "bailer buckets" can be used for water extraction, rather than pumps. Bailer buckets can be made in any size to suit the casing, but those for a 6-inch casing are conveniently made to pull 20 litres at a time.

In addition to normal cable percussion drilling, hydraulic versions of the rig can be configured for the safe handling of pre-cast concrete well liners (caissons) both for installation and extraction, if required.

The tripod format of our rigs lends itself to working over existing hand dug wells and drilling to increase the depth and yield.

Further details of the Consallen range of cable percussion drilling rigs, drilling tools and equipment, including a video, can be seen at: <http://www.consallen.com/forager/>

<http://www.consallen.com/forager/>