



ON-SITE“ Solutions

**CIVIL ENGINEERING DESIGN QUESTIONS
FOR ON-SITE WATER SUPPLY &
WASTEWATER DISPOSAL**

www.emiusa.org/documents/volunteerRes/CIVIL_design_Ques.doc

Helmut Jung, 2008

CATEGORY 1 – HOW MUCH WATER NEEDED DAILY?

- A. GATHER WATER USE DATA...While on site, it is important to monitor and measure water use in daily activities....cooking, bathing, toilet flushing, etc. to come up with empirical water use data. Come up with projected water usage for the future site development (in phases if needed).
- B. USE CHARTS...In addition, use charts/established data for similar facilities to come up with projected water usage for the future site development (again, in phases if needed).
- For facilities such as schools, churches, etc. you might choose to use the attached Water for the World data.
- C. COMPARE the projected water use rates that you developed from both the empirical data you measured on site and the projections you developed from charts...use your judgement and make your final projections based on an evaluation of the two sets of water use data.

CATEGORY 2 – WHAT WATER SOURCES ARE AVAILABLE?

Consider all possible water sources.

- **SHALLOW WELL...**Is there currently a shallow dug well on site or near the site? Is this the locally preferred water source? Investigate the construction method and make design notes. What is the expected depth? Can you take a water sample and have it analyzed? What type of treatment methods are feasible? Will the well dry up in the dry season? Investigate the costs of construction.
- **DEEPER WELL...**Is it feasible to have a well drilled? Find a drilled well on site or very near the site and find out it's depth, capacity, and construction method. Do everything you can to find a written well log for this well or interview the actual driller.

CATEGORY 2 – WHAT WATER SOURCES ARE AVAILABLE? cont.:

- SURFACE WATER...How far away is the surface water source? Can you do a water analysis? What treatment methods are feasible? Consider intake design. What is the cost of constructing the intake and treatment system?
- COMMUNITY WATER SYSTEM...Is there a reliable community water distribution nearby? What amount/pressure of water is available? How far away? Will the water need treatment to make it drinkable? Consider construction costs for tying into the system. Interview local utility manager.
- RAINFALL COLLECTION...Find accurate weather data...precipitation and evaporation from government offices if available. Look for data for a large nearby city in tourist books if more accurate data is not available. Will rainfall provide enough capacity for the site?.

CATEGORY 3 – consider onsite waste water disposal

- see Prof Haberl

CATEGORY 4 – HOW TO LAYOUT SYSTEMS

Remember the BASIC LAYOUT RULES and work with master planner to incorporate the water/ww systems into the master plan:

- 1.Distance between well and septic tank....minimum of 50 feet
- 2.Distance between well and soil absorption area ... minimum of 100 feet
- 3.Distance between soil absorption area and stream or embankment....50 to 100 feet or more.
- 4. Put water well on upper end of site if possible and protect from drainage to the well
- 5.Put soil absorption area on the lower end of the site and lay out the trenches to follow the contour of the land.

CATEGORY 5 – PROVIDING WATER PRESSURE

There are two major methods of providing water pressure:

- **Elevated Tanks** – this provides pressure by gravity and since people do not typically expect a lot of water pressure, this can often be placed on the roof. This is a great way to provide 1 to 2 days of emergency water storage if the pumping system were to go down.
- **Pressure Tanks** – a pressure tank is an inexpensive way to provide pressure to a system. Application can be limited, though because of unreliable electricity (there is very little water storage in a pressure tank), inavailability of pressure tanks and parts, etc. There will be good places to use these though.
- **CAUTION...**If you plan to use a water filter (whether at the tap or for the whole system), you may be required to supply a certain amount of pressure for the filter to work properly. If so, you will need to provide a high enough elevated tank or a small pressure tank just ahead of the water filter.

CATEGORY 6 – DRAINING THE SITE

- LOOK for signs of flooding or other drainage problems. ASK several locals about drainage issues they have noticed at the site. Realize that interviews will not normally provide accurate information, but can reveal general issues.
- ASSIST IN TOPOGRAPHIC SURVEY. Make sure all topographic characteristics relevant to drainage are included in the survey.
- Obtain flood/precip data from government if available (good luck on this one!))



