



Natural Systems for Wastewater Treatment in Kenya

Sarah den Haring

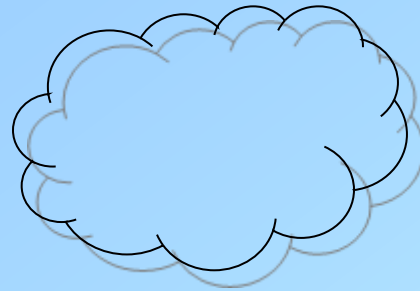
Director - GreenWater

GreenWater provides low tech, appropriate solutions to all waste water and water supply issues

- Water recycling
- Water conservation
- Water management (including drainage)
- Environmental systems



Efficiency devices
Best practice



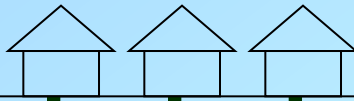
SUDS
Rainwater collection
Groundwater recharge

Storm water

Water supply



Waste water



"Green Building" movement

Reed beds and constructed wetlands
Greywater re-use



Treatment Systems

Reed beds



Constructed Wetlands



What do they do?

- Purify water & achieve NEMA discharge standards (BOD and TSS reduced by 90%)
- Emulate nature using naturally occurring bacteria
- Provide a beautiful and biologically rich environment



History & Development

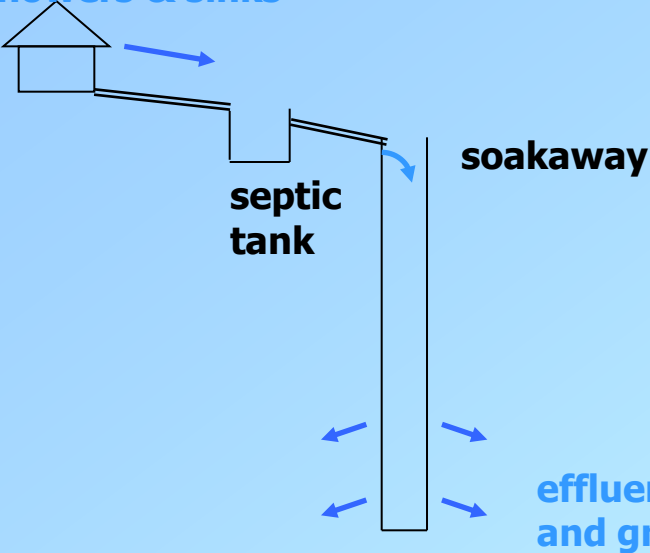
- Last 20 years - reed beds widely used, studied and improved
- Majority of systems in Europe and North America
- Particularly appropriate for Africa as warm temperatures encourage microbial activity
- Simple, robust treatment for wastewater
- Bespoke system designed to fit your site
- Basic maintenance

Affordable - Operable - Reliable



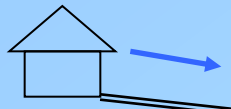
A Conventional System

Water from toilets,
showers & sinks



A Combination Reed Bed System

Water from toilets,
showers & sinks



septic tank

dosing chamber

vertical flow
reed bed



horizontal flow
reed bed

sample/level
chamber

humus tank

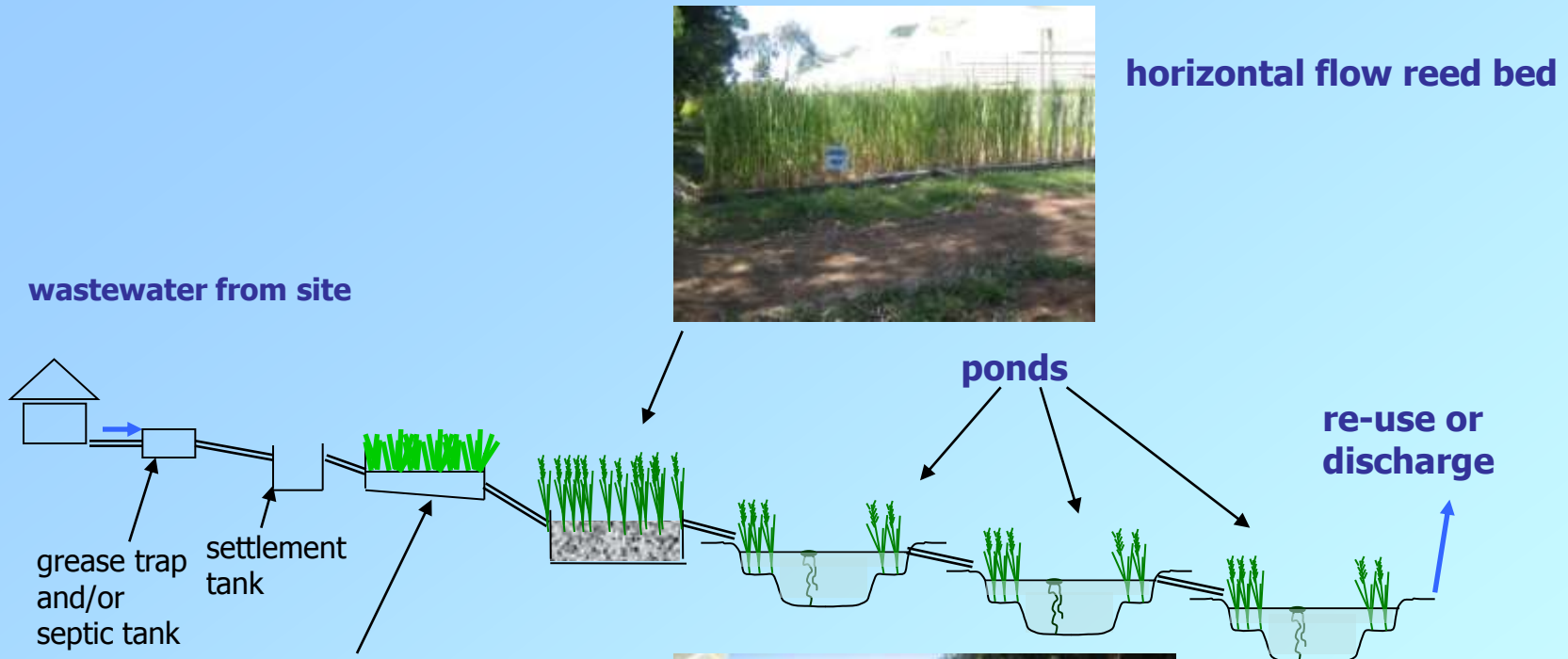
pond or storage tank



For
irrigation or
other uses



A Constructed Wetlands System



biofilter

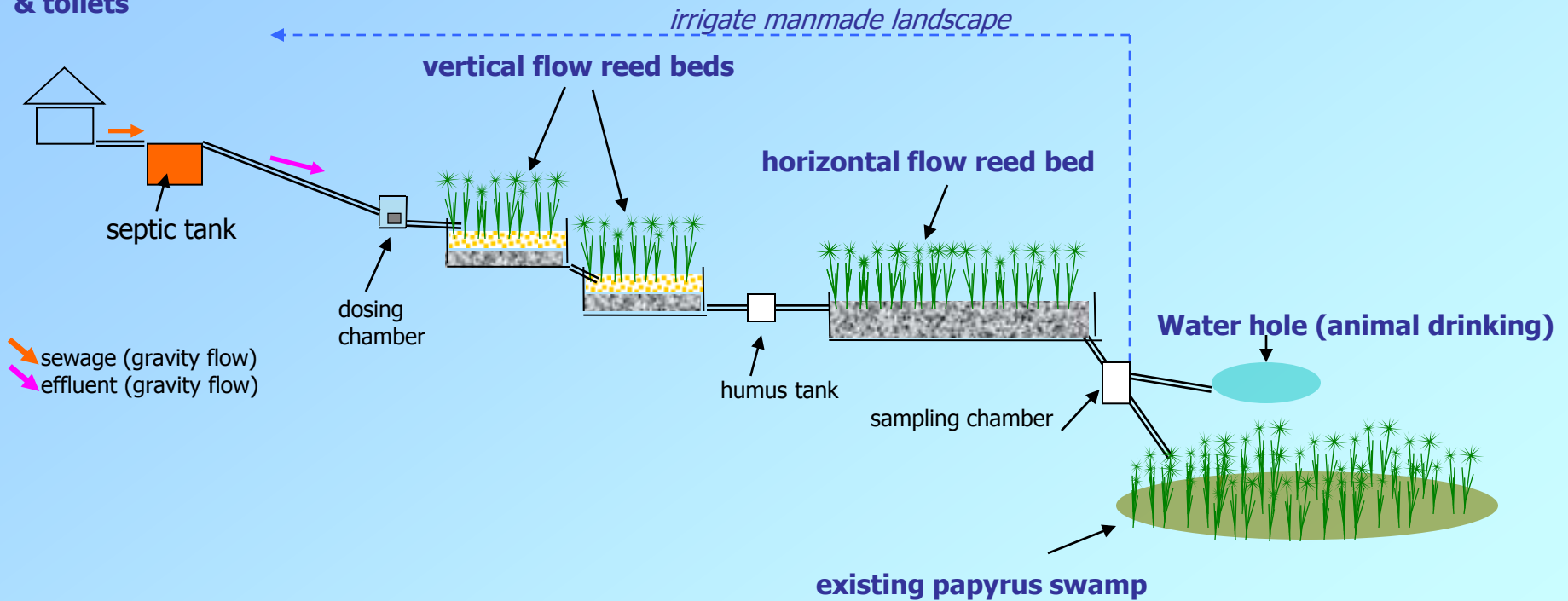


GreenWater Projects Issues & Solutions

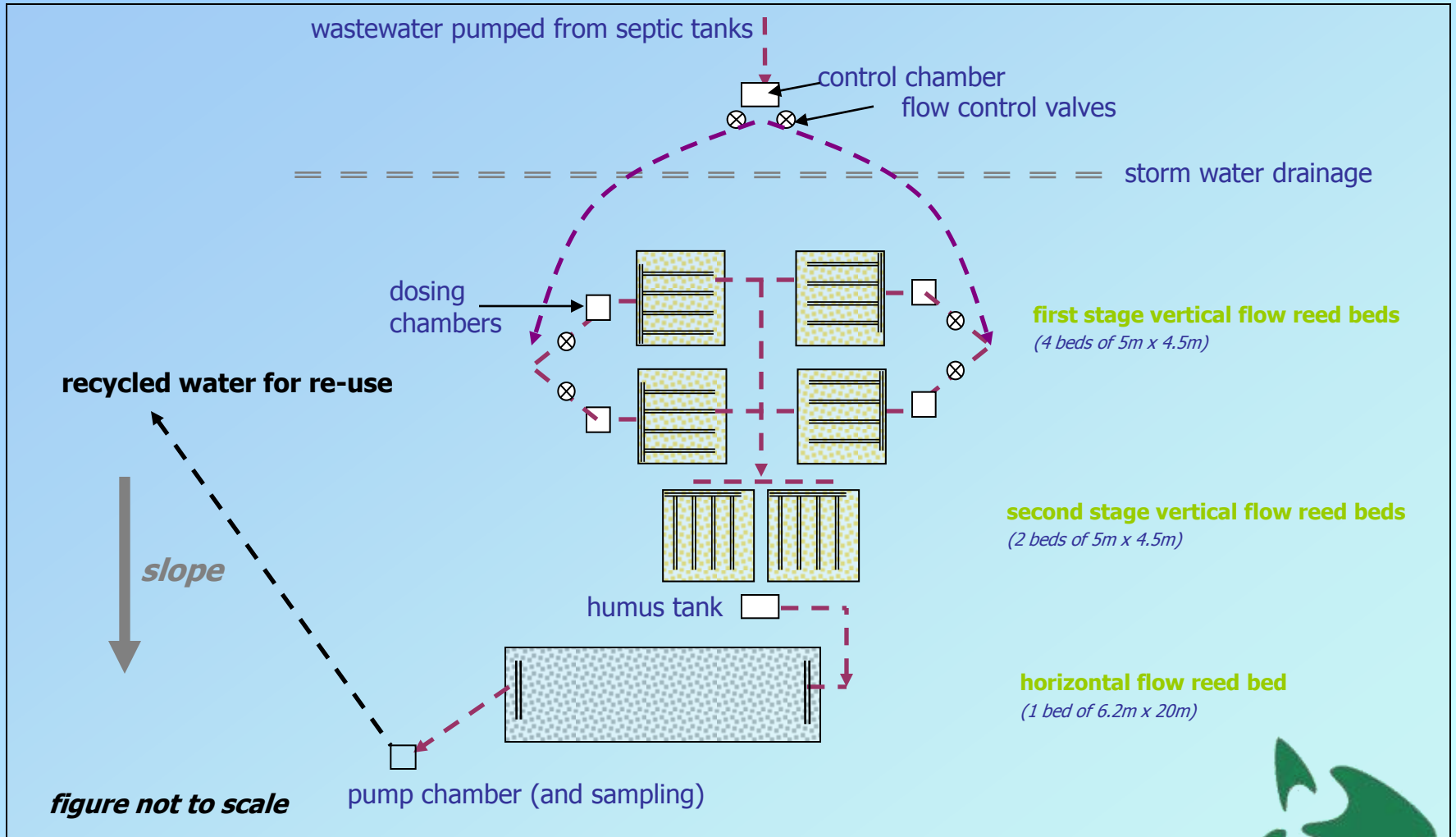


Section Schematic of Combination Reed Bed System Tented Lodge - Uganda

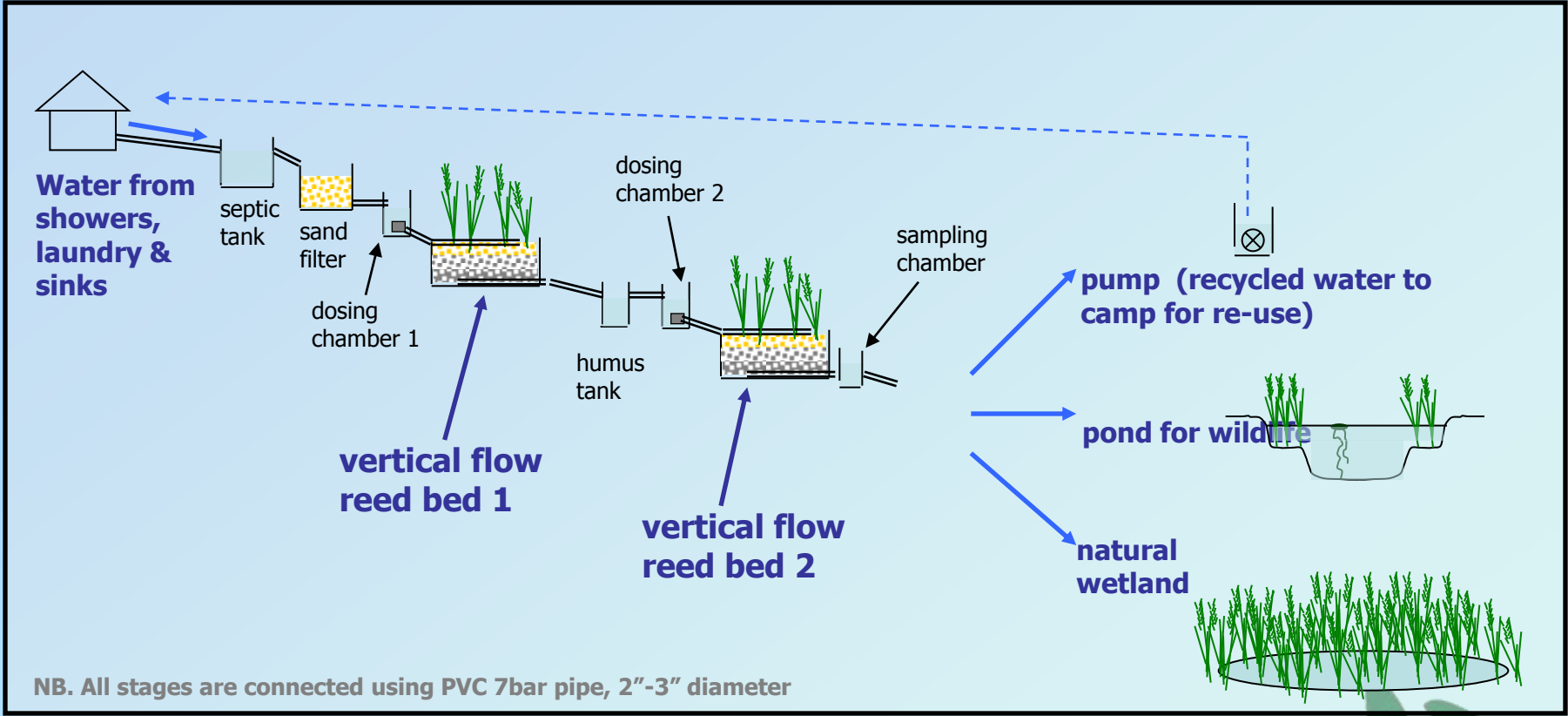
water from
showers, sinks
& toilets

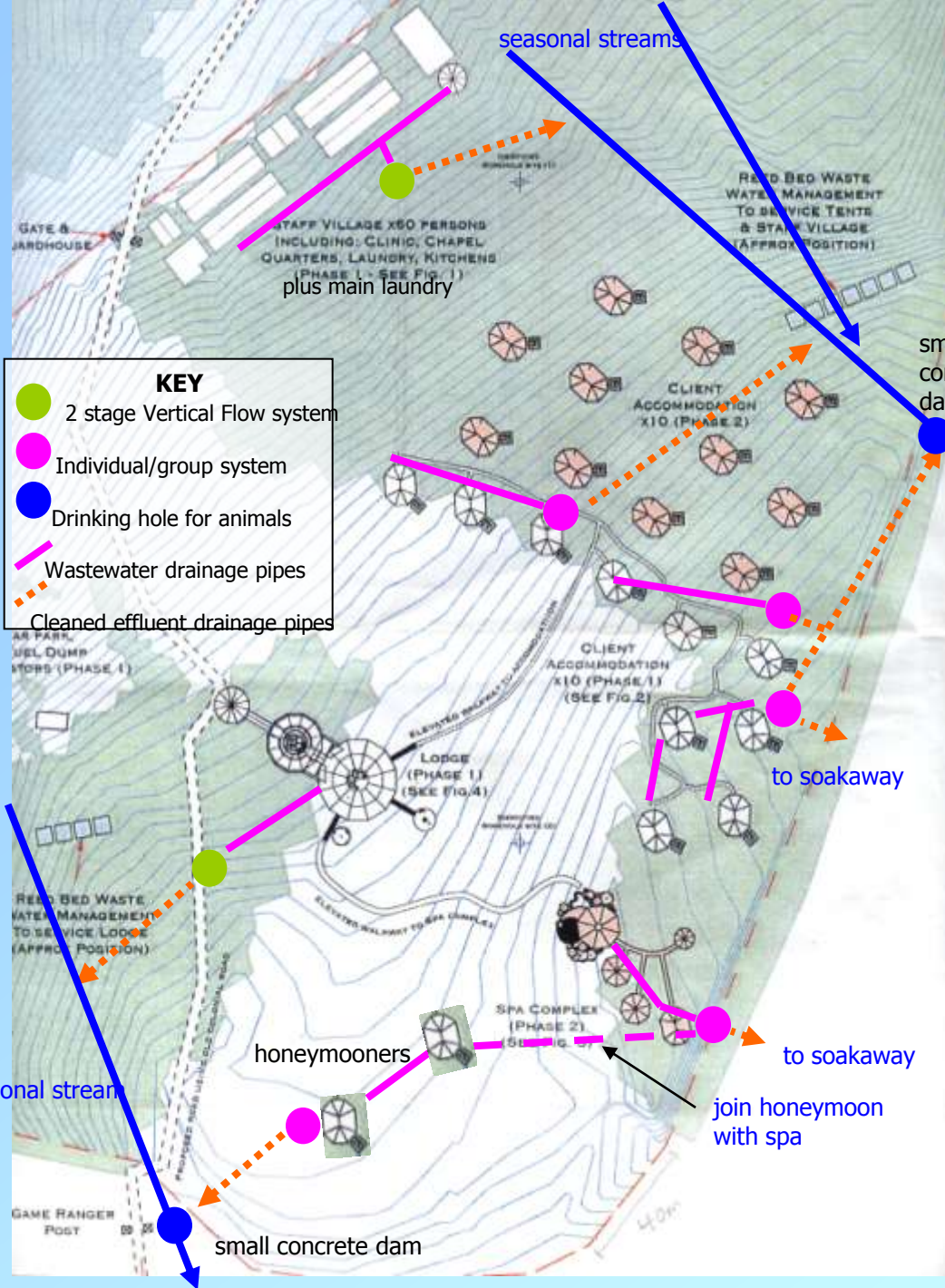


Plan Schematic of Combination Reed Bed System Tented Lodge - Uganda



Grey Water Reed Bed System Tented Lodge





Grey Water Reed Bed System Tented Lodge







GRAVEL
BED



14/10/2009









THE PLANT WATER PURIFICATION PLANT

A piece of nature to balance technology.

A symbol of the never ending cycle.

A piece of genuine living and flowing nature which renews itself continually as an ambassador of the big empire of nature.

You hear Bachmusik – the music of the creek.

This is the sound of the steady flow of the same water through the plant water purification plant. The seeping through the root area of the waterplants lasts one hour.

The roots of the water plants emit oxygen and transform what we humans call dirty water into plant substance.

We witness the never ending purification and renewal cycle in the smallest space in harmony with the laws of nature. This water purification plant is enriching us ecologically, optically and acoustically. It is a small step of the so called civilized man who is estranged from nature towards a peace treaty with nature.

It helps to bring back to man what he is longing for and what technology cannot do.

Man feels sheltered and safe again, there where nature and art reunite, and man can regain a tiny part of his good consciousness towards nature.

Hundertwasser, July 3, 1986 from New Zealand, Kaurinui



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