

# Design of a Gravity-Fed Water System to Deliver Safe Drinking Water to Villages in Vanuatu

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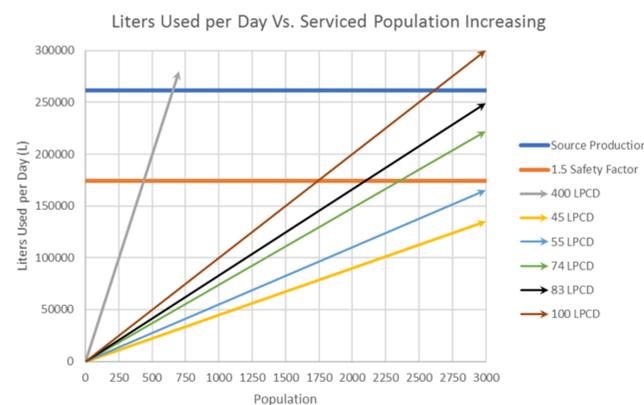
## Project Background

On the island of Espiritu Santo, Vanuatu, about 30 villages lack direct access to safe and potable water. We are working in partnership with Friends in Action to design a gravity fed water system to solve this problem. A gravity fed water system is an effective solution because it is a sustainable water system that can transport water to the villages locally on the island with zero energy footprint. By providing access to water, the local people will no longer have to walk miles to retrieve water from the nearby river.



## Water Demand

- Current Population: 1300 people in 30 villages
- Population growth: 2.35% per year
- Modeled potential water uses to determine the population the system can support



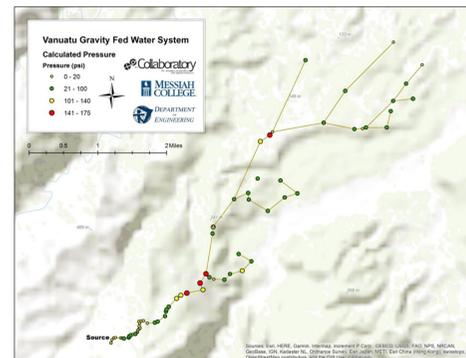
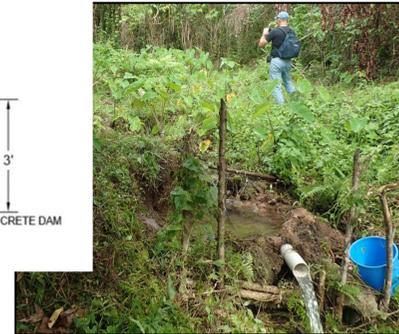
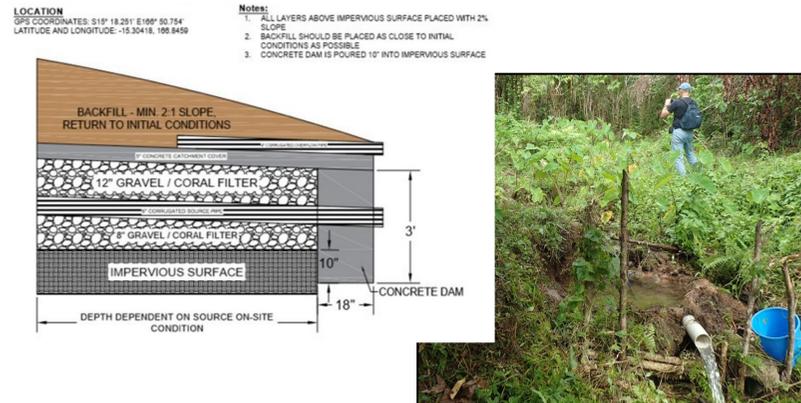
## Our Partner

The Gravity Fed Water project team collaborates with **Friends in Action International** to serve our brothers and sisters in Espiritu Santo, Vanuatu.



## The Water System: Spring Catchment

- Offset spring catchment
- ~48 GPM flow rate
- Highest elevation point
- Reduce contaminants
- Fencing around area



## Piping Network

- ~15 Miles of HDPE piping
- EPANET and Microsoft Excel models for pressure calculations along system
- Break pressure tanks designed in areas of high pressure
- 300 and 1000 Gallon water tanks at most villages

## Water Treatment

- The water may need to be treated to avoid hardness scaling
- Possible solution: Polyphosphate Silicate in the form of Siliphos Spheres
- Prevent mineral build-up and decreased flow rate by dissolving into the water and coating the pipe to prevent scale
- The amount of polyphosphate that will be used is safe for human consumption once dissolved in water.

## Cost Estimate

Piping	\$100,800
Tanks & Concrete Slabs	\$31,080
Equipment	\$8,560
Intake Structure	\$12,300
<b>Subtotal</b>	<b>\$169,000</b>
Contingency Factor (10%)	\$16,900
<b>Total</b>	<b>\$186,000</b>

\* Does not include: labor, transportation, overseas shipping

## Implementation

- Church involvement to provide volunteers are to foster church-community partnership
- Water Committee made up of diverse group of people for organizing labor and maintenance of system
- Water, sanitation, and hygiene education using relationships to reduce disease-causing practices
- Long-term sustainability to ensure that system will continue to function with limited outside help

## Project Impacts

Some of the potential impacts of installing the gravity fed water system on the island of Espiritu Santo, Vanuatu include:

- Access to safe, potable water
- Reduced disease
- More people brought to Christ
- Reduced time spent getting water to allow more time spent on education, working, and further development

## Acknowledgements

We would like to acknowledge our mentor, Thomas Soerens, and our other team members: Nathan Hardman (Student Project Manager), Jamar Gittens Jr., and Kurtis Platteel.

