

### Project Objectives

- Site Visit:**
- Assess water systems of two Ngobe communities in Bocas del Toro, Panama.
  - Test water quality.
- Semester Project:**
- Identify potential design proposals.
  - Develop and propose design alternative.

### Background Information

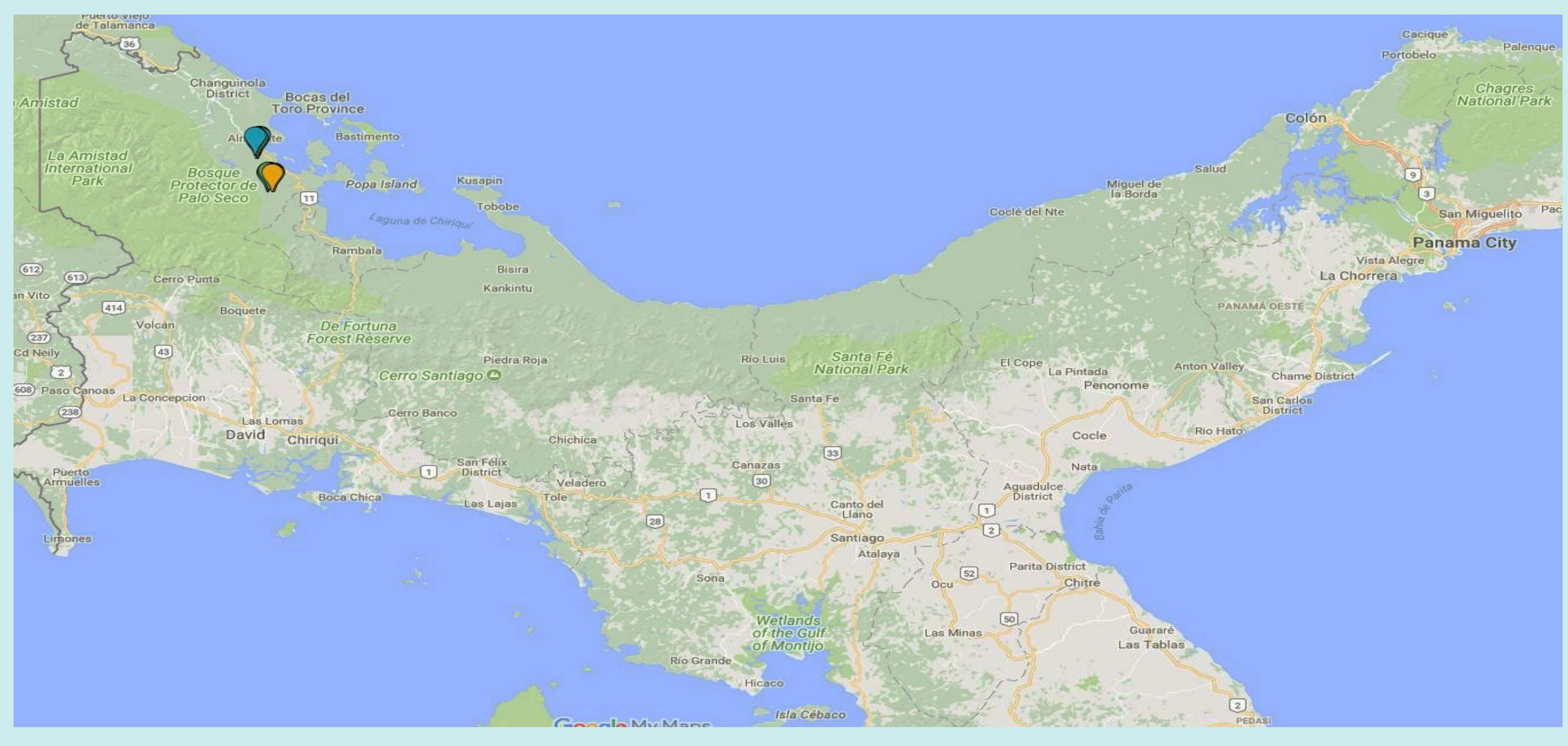


Figure 1. Site Locations in Bocas del Toro, Panamá: Quebrada Platano (gold), Rio Oeste Abajo (blue).

- Lucy-Chen Inc. traveled to Bocas del Toro, Panama to work with two native Ngobe communities and their respective Peace Corps Volunteers.
- The problems being addressed included:
  - Water Reliability
  - Water Quality
  - Turbidity
  - Sedimentation/Clogging

- Quebrada Platano Sources:**
- Big Tank Network
  - Spring Network
  - School Network
- Rio Oeste Abajo Source:**
- Palo Seco Network

### Data Collection and Analysis

Surveying	Hydraulics	Water Quality
<ul style="list-style-type: none"> <li>GPS Elevation Profile &amp; Waypoints</li> <li>Rangefinder</li> <li>Abney Level &amp; Tape</li> </ul>	<ul style="list-style-type: none"> <li>Flow Rate</li> <li>Pressure Head</li> <li>EPANET Analysis</li> </ul>	<ul style="list-style-type: none"> <li>Coliform</li> <li>E.coli</li> </ul>

### Final Design Proposal

- Summary List of Proposed Designs**
- Quebrada Platano
    - Big Tank Network
      - Sedimentation Tank
      - Inlet Alternatives
      - Pipe System
    - Spring Network
      - Spring box
      - Storage Tank
      - Pipe System & Taps
    - School Network
      - Sedimentation Tank
      - Inlet Alternatives
  - Rio Oeste Abajo
    - Palo Seco Network
      - Sedimentation Tank
      - New Storage Tank
      - Inlet Alternatives
      - Pipe System

#### Sedimentation Tank:

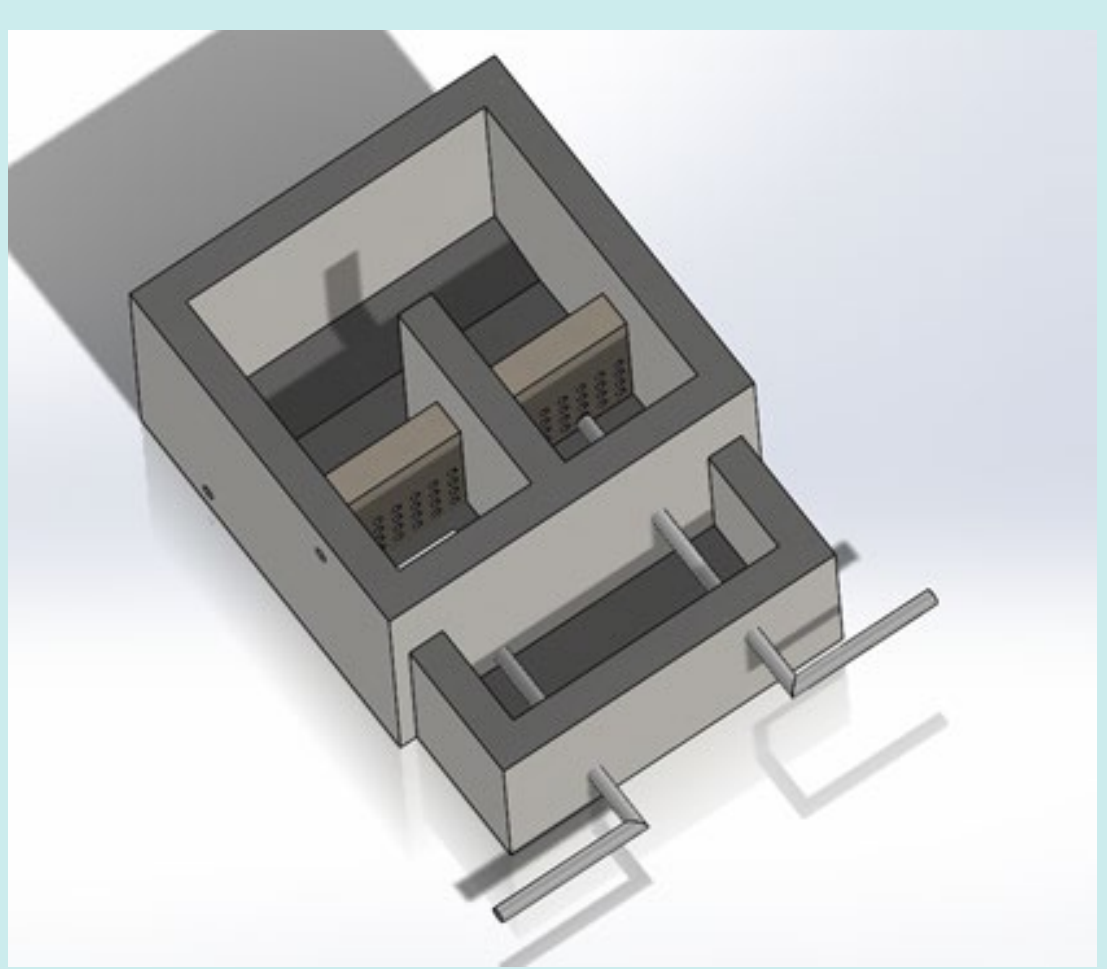


Figure 2. General sedimentation tank design.

- Two baffle walls for even laminar flow.
- Retention Time: 20 min.
- Reduce in-line build up and system clogging.

#### Spring Box:

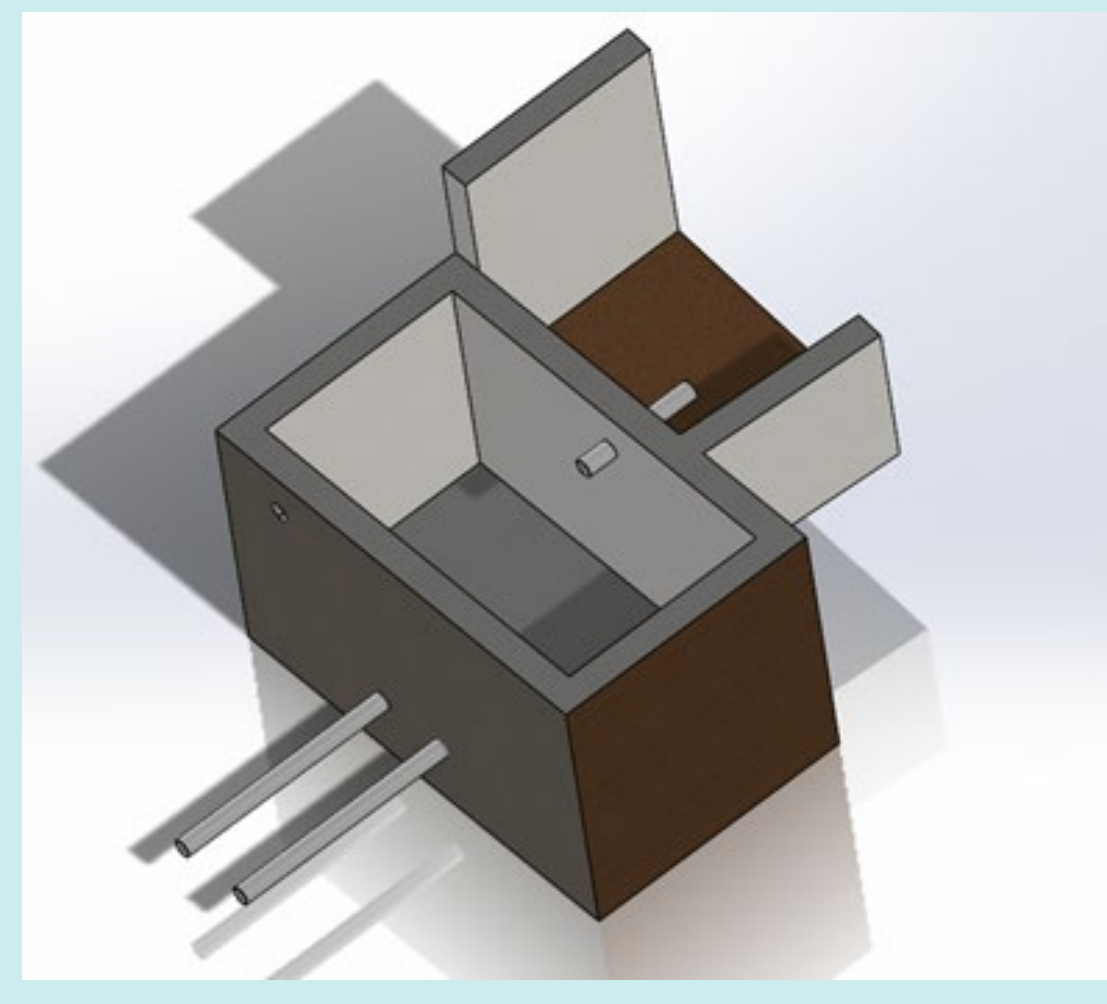


Figure 3. Spring box general design for Quebrada Platano.

- Accommodates for the natural shape of the landscape.
- Utilize relatively good water quality source.
- Capture inlet water while decreasing exposure.

#### Inlet Alternatives:

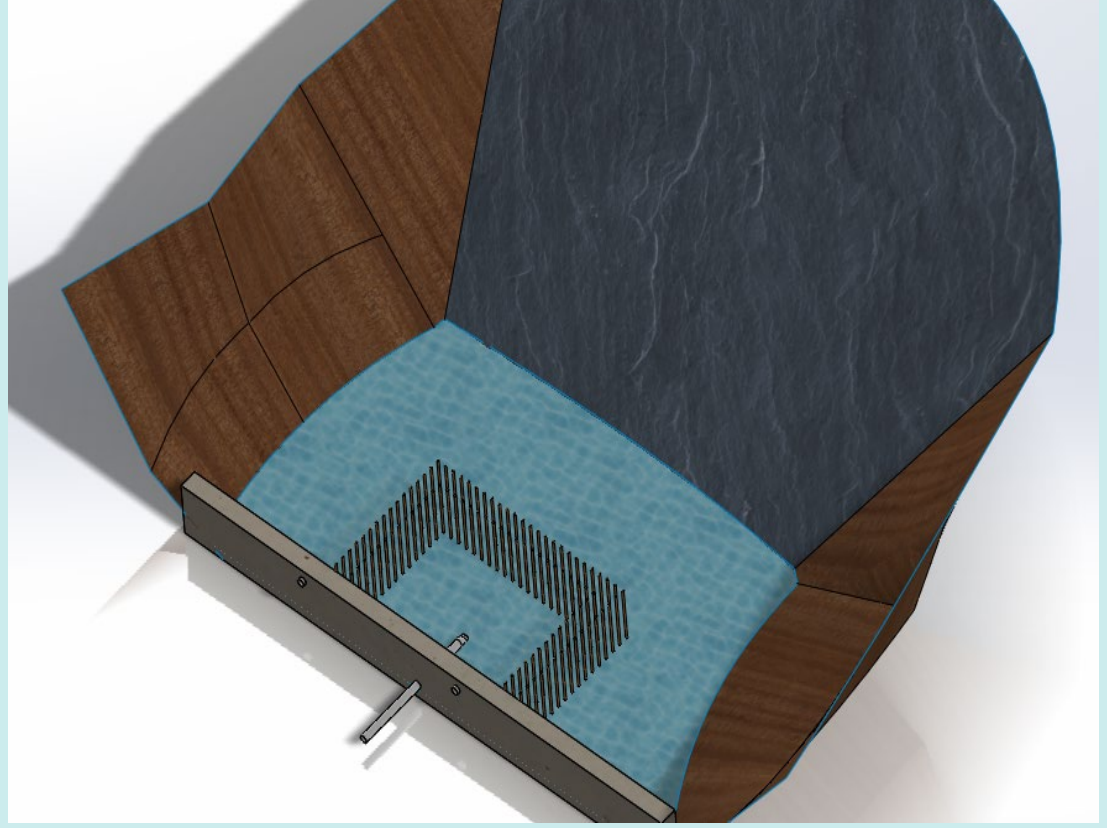


Figure 4.(above) Inlet design alternative for Quebrada Platano School Network.

- Increases effectiveness of proposed designs.
- Reduce clogging at the intake structures.

### Water Treatment

Water quality is also a major concern for water consumption from each of these sources.

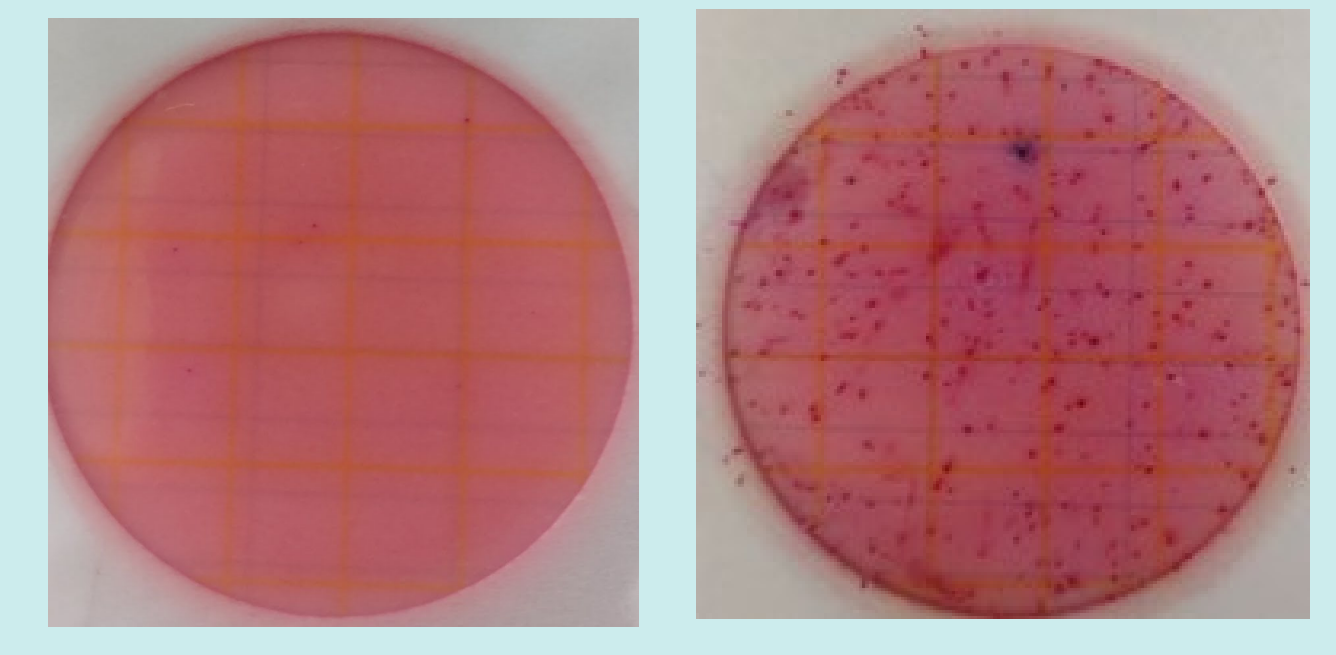


Figure 5. Quebrada Platano water quality testing: Spring Inlet (left), School Tap (right).

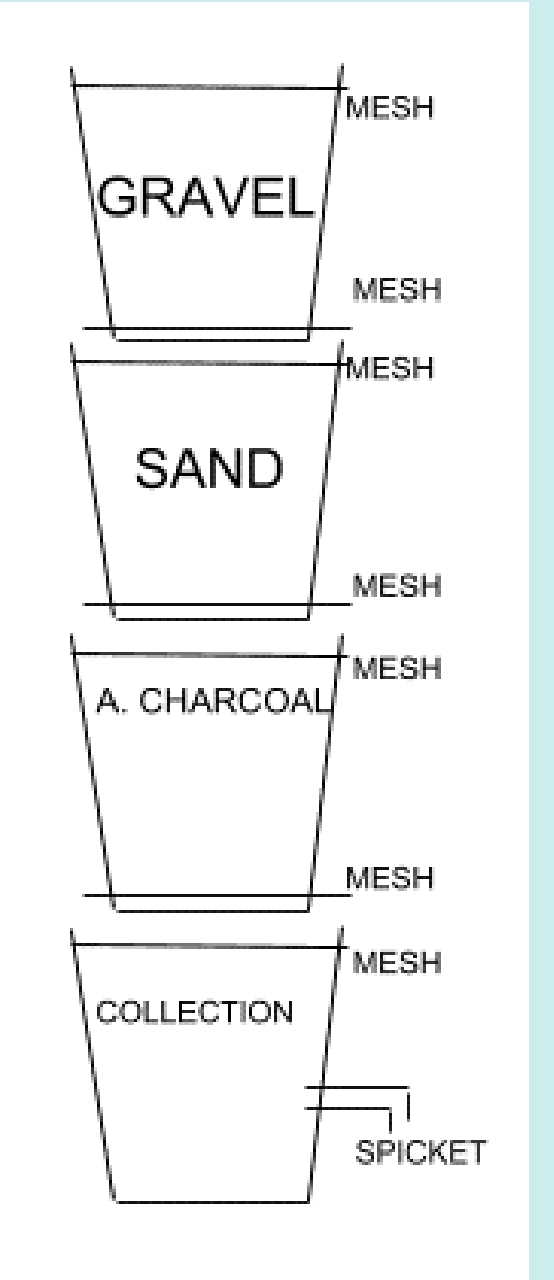
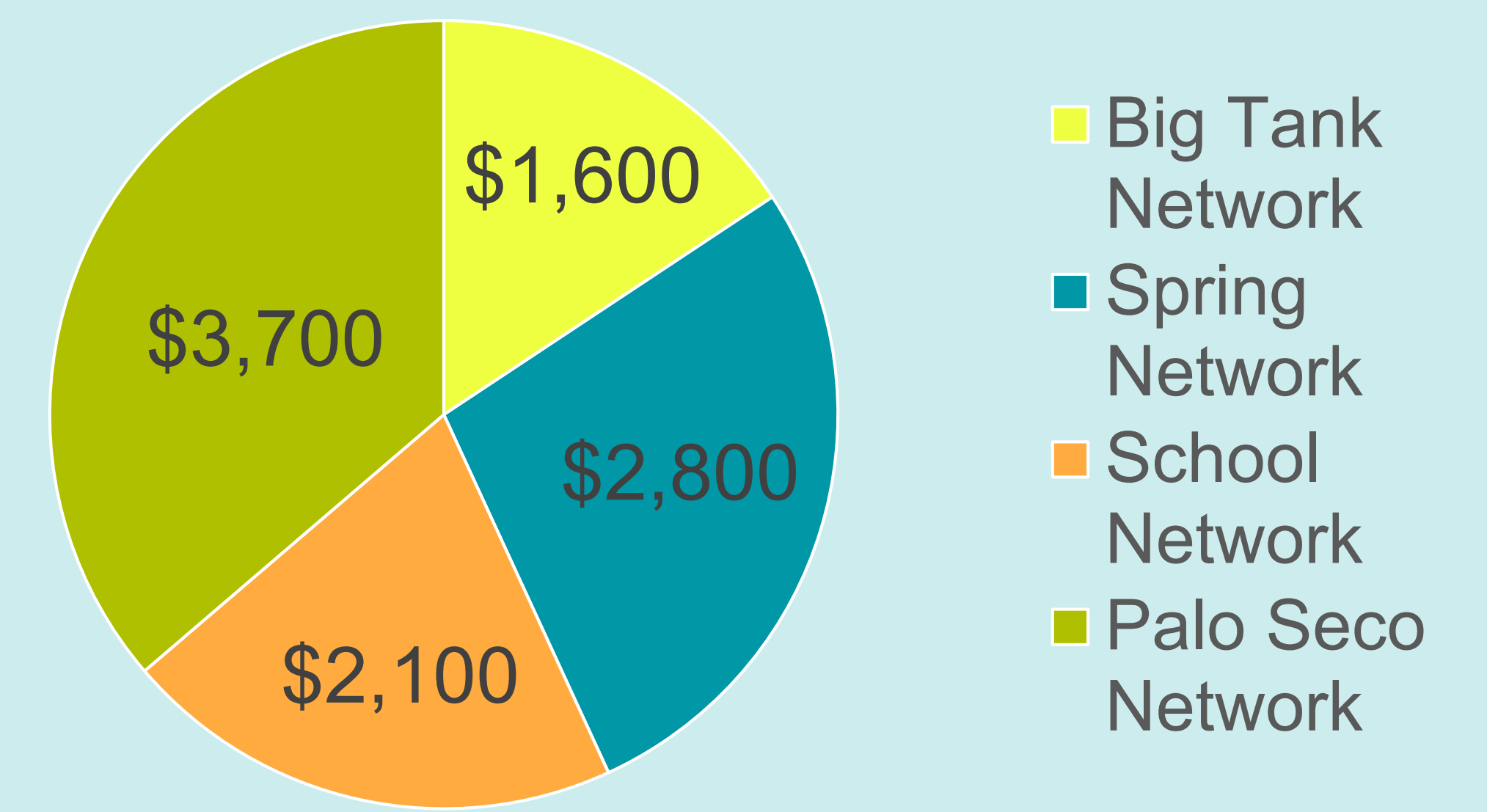


Figure 6. Alternative Individual At Home Filtration Treatment System.

### Implementation

**Cost Estimate by Source:**  
\*20% contingency and mobilization not included.



#### Construction Schedule:

Project	Estimated Schedule
Big Tank Network	29 days
Spring Network	52 days
School Network	33 days
Palo Seco Network	63 days

\* January-April Construction

### Recommendations

- Peace Corps Volunteer(s) Propose Designs
- System Maintenance & Adjustments
- Maintain Water Committee Reliability & Motivation
- Maintain Government Recognition
- Acquire Project Funding