



Figure 1. Rain Water Catchment in El Hueco

Coclé, Panama

- during dry season

2. Community Background

El Hueco is located a half hour north by vehicle of the nearest city, Nata, which lies on the Pan American Highway

Community of 15 people:

- . Five homes in village
- Community members are all related
- Catholic Latino (Spanish speaking)
- Subsistence farmers

Three nearby communities:

- Guayabital Arriba, Guayabital Abajo, Loma Chata
- All have water systems and water committees
- . Shared elementary school between four communities

Surveying of Water Route

- 8 km distance from water source to village
- Equipment: laser range finder, Abney level, tape measure, GPS

Flow Rate Measurements

- . Springs fill storage tank that El Hueco will use
- Measurements taken from spring box clean out pipes
- Available water for Loma Chata and El Hueco:
- 105 gallons/person/day



Figure 3. Route

Water Quality Coliform Tests

- . Chlorine residence time allows for appropriate treatment of El Hueco water





EPANET Model

- . Simulation of system pressure
- Simulation of varying water usage demand
- Models used to select pipe diameters, locate pressure break tank, and determine water availability

Gravity-Fed Water System Design El Hueco, Coclé, Panama

3. Data Collection and Analysis

Water distribution system modeling software



Figure 4. Spring Box with Concrete Lid

- Coliforms found at both spring boxes and at the storage tank
- . Chlorination system on distribution side of storage tank

CYC Environmental Engineering

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4. Final Design Recommendations

STORAGE TANK



Figure 7. Masonry Tap Stand [cm] (Handbook of Gravity-Flow Water Systems, Jordan, 1980)

Distribution Lines

- 1/2" SDR 26 PVC pipe to taps
- 5 reinforced concrete tap stands for 15 people

Pipeline Crossings

- . 1 suspended road crossing
- . 3 underground road crossings
- . 2 river crossings
- . 22 stream crossings







Delivery Fuel Reduced Cost: \$7,500 **Total Cost: \$14,500** The reduced cost removes items that have alternate funding or that the people of El Hueco are unlikely to fund, such as reinforced concrete tap stands and water crossings with concrete anchors. This project will be constructed by the people of El Hueco, with Peace Corps Volunteer supervision, over a period of four months. The system should require limited maintenance, which will allow the system to operate smoothly for many years.

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Figure 9. Basic Design of Suspended Road and River Crossings (Field Guide to Env. Eng. for Dev. Workers, Mihelcic, et al., 2009)

5. Cost Estimation and Scheduling

Alternative system (pump from well) would cost \$8,000





- Fittings
- Misc. Construction Materials

University*

- Crossings



