Rainwater Collection in Huhuetenango, Guatemala

Saehan Lenzen and Thomas Jimenez Nickerson with Finca Juvinil

Abstract

The ETHOS team travelled to Huehuetenango, Guatemala for 10 weeks during the summer of 2016, where they worked and lived in a youth ranch located in the village of Chinaca. Finca Juvenil is a working boys ranch that houses around 20-25 boys that come from abuse, neglect, or abandonment. Mark Wakefield, working through Zona Juvenil Youth Organization, is the primary caregiver, and creates a positive home environment for these troubled children that have been left behind by the court system and family. The team contributed to many different projects for Finca Juvenil, but the main two projects they focused on were construction on a kitchen expansion with underground rainwater collection tanks, and a rainwater collection system connecting various buildings owned by the ranch.

Introduction

- The biggest problem currently faced by the Finca Juvenil is a lack of water resources due to the location of the ranch in an area of high altitude
- The ETHOS team sought to alleviate this issue for daily life and future development by designing a rainwater collection system for the ranch
- In connection to the rainwater collection system, the ETHOS team assisted in the kitchen expansion project

Figure 1: Rainwater spilling over roof without gutters

Project Description

- The ETHOS team collaborated with a local engineer to design the rainwater collection system and assisted a local architect on the ongoing kitchen expansion project
- The ETHOS team measured several roofs on the ranch and calculated the average amount of runoff which enabled the necessary tank volume to be determined
- After these calculations were done, the team created material estimates for the tanks needed and discussed with an architect the location of the tanks

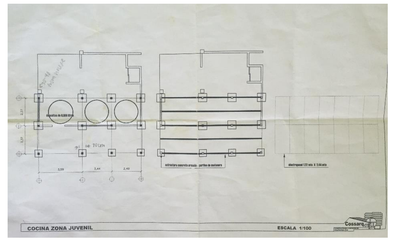

Figure 2: Design for kitchen expansion with water tanks

- A major task for the ETHOS team was digging three circular one meter holes for water tanks and twelve one meter square holes for column supports used to hold up the floor above the water tanks

Figure 3: ETHOS team and Finca Juvenil boys digging holes for water tanks

Results & Discussion

- The rainwater collection system designed as a collaboration between the ETHOS team and the engineer.
- The host has all the information necessary to move forward on rainwater collection project including cost and quantity estimates for every material necessary

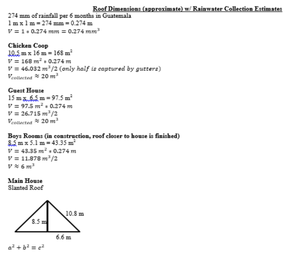

Figure 4: Rainwater collection system dimensions and collection calculations

- With an average rainfall of 274 millimeters during the rainy season, the total amount of water collected from rainwater collection system would approximate to 40,000 liters
- With the total capacity of each tank equaling 6,736 liters, the water stored in the three tanks would last approximately 3 to 5 days on the ranch
- The kitchen expansion project with the implemented tanks should be completed within the next year

Figure 5: Workers constructing a column to support the kitchen floor

Recommendations

- The team recommends keeping the engineer very involved in the process because he was so integral to the thought process behind the calculations, estimations, and material decisions
- Preparations are done so that both the ETHOS team and Finca Juvenil are fully equipped for the trip

Figure 6: ETHOS team with youth from the Finca Juvenil

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