Austin Kim October, 2024

Forge Garden

Water Feature

- 1) Project Description
- 2) Interview Summary
- 3) Brainstorm
- 4) Research
- 5) Design



Project Description

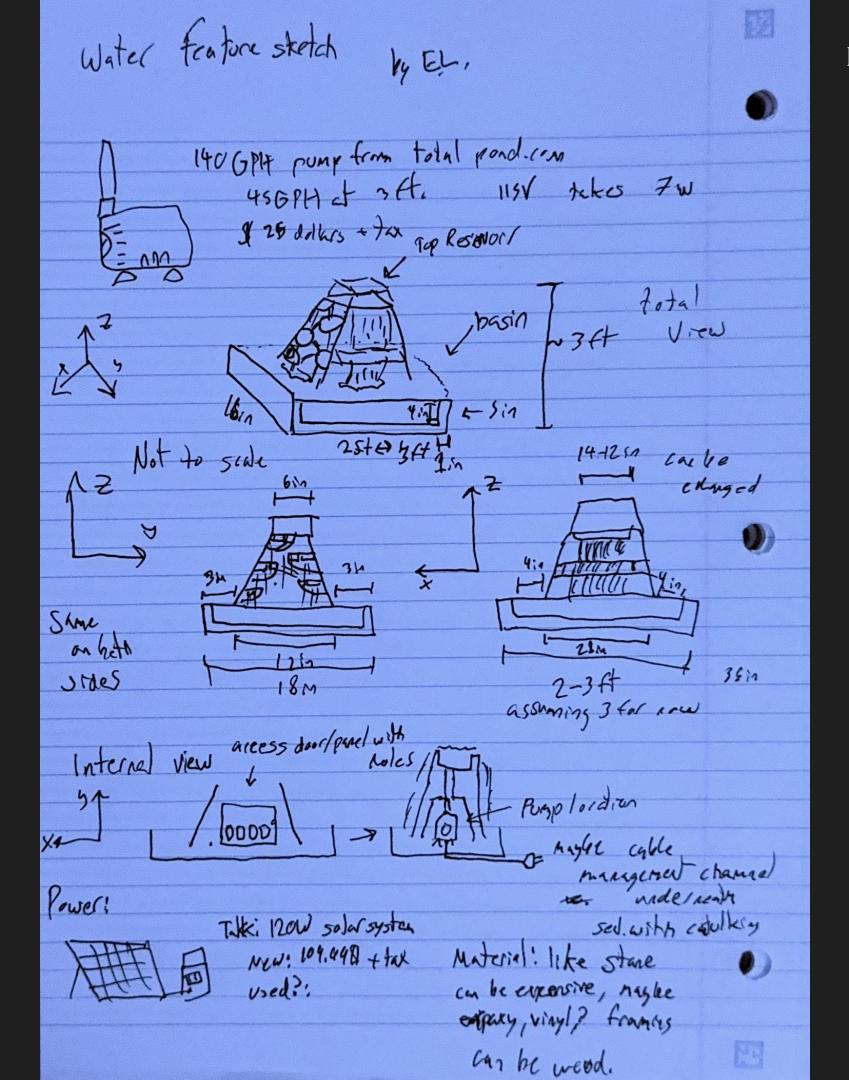
- Collaboration with the Santa Clara University Engineer 110 Group,
 Muwekma Ohlone Tribe and Forge Garden
- For the Muwekma Ohlone Tribe and the general community
- Objective: Create a vertical water feature, where the sound of running water could be heard Integrate decorative features that resemble Muwekma Ohlone Tribe such as abalone shells

Interview Summary

- Abalone shells are an importance to the Muwekma Ohlone Tribe
- The water should fall vertically, and the fountain itself should be relatively small
- The system should be on 24/7 using renewable energy
- Cares about longevity, but can have some maintenance necessities aspects
- Abalone shells are emphasized (we don't know if she wants it on the fountain or around)

Brainstorm

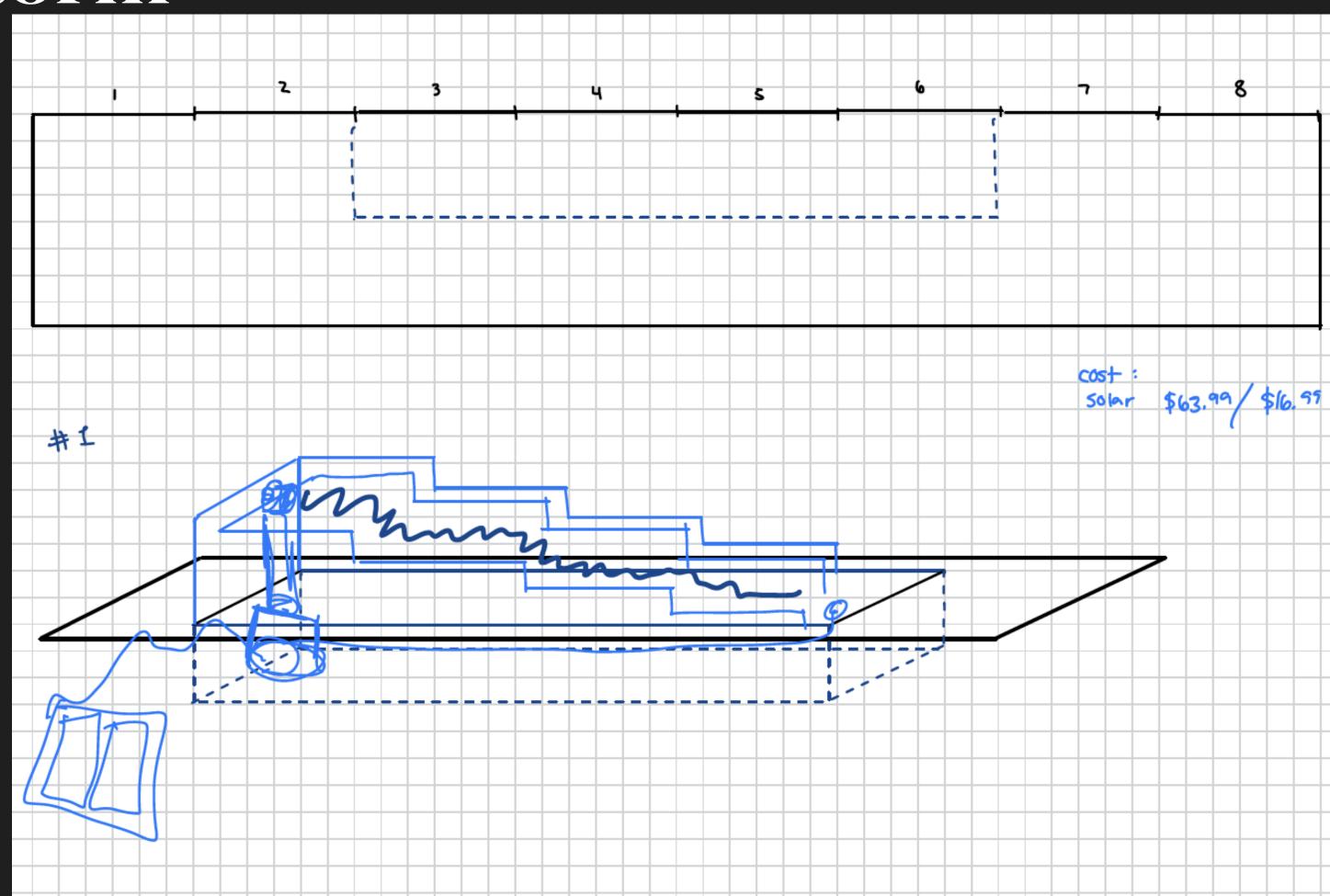
Credit: Erick Lopez Idea 1



Forge Garden: Water Feature

Brainstorm

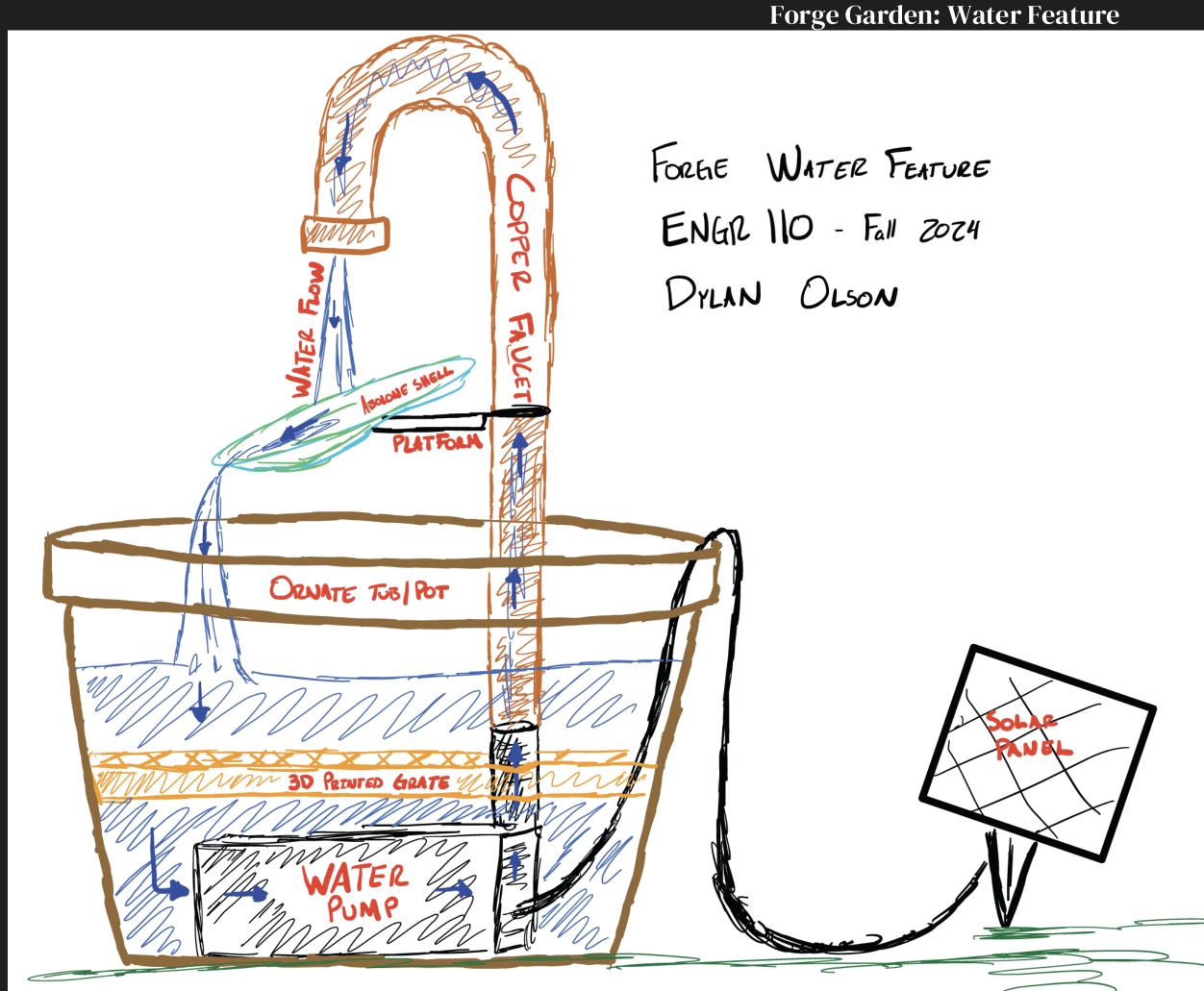
Credit: Tiffany Doan Idea 2



Brainstorm

Credit: Dylan Olson

This is the idea we have collectively decided on. Forge Garden, Muwekma Ohlone Tribe, and us, all think this idea would be the most viable to implement.



Forge Garden: Water Feature

Research: Part Analysis

Elements that are needed



Water Feature & Catchment System

Core of Our Project

Some source of renewable energy

Additional Benefit

Aesthetics

Abalone Shells



Plant Bed (provided)
What we are working with

Info on Solar Pump

Battery Capacity in Wh x Battery Efficiency / Wattage = Total Time

Runtime Calculation will differ for each pump We will consider the efficiency, and power factor of the battery while selecting our parts.



Working Process of a Solar-Powered Water Pump



Solar Panels Collect Sunlight



When the sun's rays strike these cells, they excite the electrons and create an electric current through a process known as the photovoltaic effect.

The electricity generated by PV cells is Direct Current (DC), which flows from the panels to cables to the inverter or directly to the pump.

PV Cells Generates
Direct Current



Inverter Converts
DC Into AC



The inverter then converts the DC electricity into an Alternating Current and passes it on to the controller.

The controller then regulates the voltage within the safe limits to prevent overcharging and potentially damaging the batteries.

Controller Regulates
The Voltage



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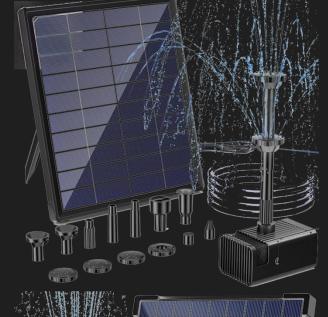
Water Pump Operation



The DC or AC electricity is passed onto the water pump, which uses it to lift water from the source and deliver it to the desired location.

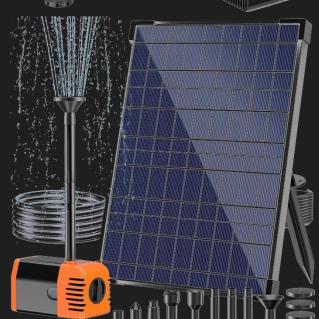
Source

Cost Analysis: Water Pumps



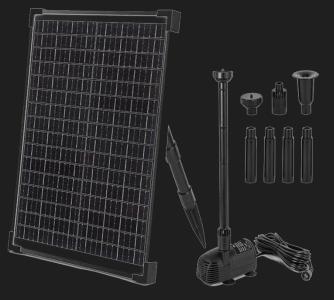
\$25.99

- + 6 W, 80 GPH + 3000 mAh Battery Backup
- Cheap



\$64.99

- + 25W, 410 GPH + Sound will be loud
- No reserve battery



\$83.99

+ 25W, 410GPH + Backup battery available for purchase



2600 mAh

Cost Analysis: Pot





Cost Analysis: Abalone Shell



\$15.99

- + Cheap+ More reflections and coverage

\$28.99

- + Full shells
- Pricy



\$17.97

- + Many Shells- Looks less like abalone Less shiny