Fence and Gates for the City Farm SLO

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This paper summarizes the construction of roughly 300 feet of game fence and two metal gates for the City Farm San Luis Obispo (SLO). The City Farm SLO is a nonprofit organization in San Luis Obispo, CA. They are focused on organic and sustainable agriculture. This paper will highlight the process for estimating, funding, scheduling, and constructing the fence and gates. This project aimed to provide a secure perimeter against pedestrians and wildlife. The project site is along the creek, attracting many unwanted guests. There were many obstacles to overcome throughout the project, from preconstruction to construction. Each phase had its own unique challenges. The first hurdle was obtaining funding. Many hours were spent calling local contractors and politicians until I finally received the money to complete my project. The second obstacle faced was the construction of the project. Finding the labor and time to complete the work was a challenge. Despite these, and multiple other obstacles discussed throughout the paper, the project was completed allowing the City Farm SLO to have an area protected against wildlife and pedestrians. The project was completed on time and within budget. Finally, the project fulfilled all items requested from the City Farm SLO.

Key Words: Service Learning, Non-Profit Project, Fence, Gate, Estimating, Construction

Introduction

The project is located at 1221 Calle Joaquin Rd San Luis Obispo, Ca 93405. The property is used by the City Farm SLO to promote organic and sustainable agriculture. They also sublease portions of their property to smaller farmers. The fence and gates are in the back portion of the property, where the City Farm SLO subleases to the smaller farmers. The goal of the project was to create a barrier between wildlife and pedestrians. The previous fencing did not block any uninvited guests. The existing fence was a silt fence with wooden posts. In some areas, the fence was five feet tall, and in others barely three feet. An image of the previous fencing is shown in Figure 1. This allowed the homeless and wildlife easy access to the property. In addition, there was no exit at here gate, just a large fifteen-foot opening between fences. Another design and construction component was to provide
two ten-foot metal gates and a seven-foot game fence protecting the property from wildlife and the public.

![Figure 1 – Existing Fence](image)

**Preconstruction**

Preconstruction of the project entitled design, estimating, funding, and scheduling. Although, the original start of the project began when the author reached out to the City Farm SLO. Andrew Kline, the project advisor, recommended contacting the City Farm SLO to see if they needed a project. The City Farm SLO was interested in completing two projects. One project was to build a shed, and the other to build the gates and fence. The City Farm SLO said the fence and gates would be more beneficial to their operations and asked if it could be completed. Three meetings took place between the City Farm SLO about the design before estimating could begin. Following these meetings, an estimate, fundraising, schedule, and design were complete.

**Design**

The design of the project was all done on AutoCAD with the assistance of Google Maps. Measurements were taken with a measuring wheel and a tape measure and then transferred to an AutoCAD drawing. Four different drafts were created before the City Farm SLO gave final approval. The original design started with an additional two H-braces. The final design included four H-braces, two metal posts, and two wooden posts not included in the H-braces, as shown in *Figure 2.*
The two obstacles with creating the design layout were working as far away from the waterline as possible and keeping the scope of work within a manageable range. The fence ran parallel to the main underground water line for the City Farm SLO. Neither the City Farm SLO nor the company who installed the water main knew exactly where the pipe was located. The City Farm SLO guessed the locations of the waterline. All liability was transferred to the City Farm SLO for any damages that could have happened due to the unclear location of the water main.

The second challenge was maintaining a reasonable scope of work. Because only one student was completing all the work, the City Farm SLO had to be reminded often how much work could be completed. Items were added and subtracted many times to create the design constructed.

### Estimating

To begin estimating, the design for the project had to be completed and approved by the City Farm SLO. Once approval was granted, estimating was in full swing. Estimating was one of the easier tasks for this project. Since the design was completed in AutoCAD, it was easy to measure and create quantities of each item. Although, finding the materials needed was much more difficult. Due to the material shortages for the Covid-19 Pandemic, many materials were hard to find. The material shortages also caused inflation and changing material costs. This posed a challenge to estimate to have enough funding to complete the project. To prevent running over budget, a form of contingency to the project estimate. There was a $300 line item to pay for any items missing in the budget or inflex in the cost of items in the estimate. Reference Figure 3 to view the project estimate.
All the work performed was free of cost for the City Farm SLO. All funding was made by outside sources. Obtaining the funding was not an easy task. Many calls were made to local contractors, suppliers, or politicians. Some were not interested in the project, did not respond to the phone calls, or would not have the money within time. The project was on hold for about a month while waiting for an entity to sponsor the project. The project almost had to be scratched due to the limited financial resources to pay to complete it. Finally, the final contractor contacted was Edwards Construction Group. Edwards Construction Group is a general contractor located in Santa Maria and San Diego, CA. Edwards Construction Group donated $2,000 to sponsor the project. The remaining $1,000 needed for the project was granted by the Cal Poly Construction Management Advisory Committee (CMAC).

**Scheduling**

Scheduling the construction of the project worked around the days the City Farm SLO would have volunteers to help with the construction. Although volunteers were available, they were never utilized. The schedule included the construction of the gates offsite and everything onsite. One week was allocated to the construction of the gates. An additional four Saturdays were scheduled for the construction of the fence. The gates were completed two weeks before the onsite construction began. The construction onsite included layout/staking, auguring holes, pouring concrete footings, installation of gates, pulling the game wire fence, and installing t-posts. All these tasks were included in the project schedule.

**Construction**
The construction of the project was in five phases. Each phase for another day at work. The phases were building the gates, layout/staking, auguring footings, pouring concrete in footings, installing gates, and pulling fences.

**Phase I**

Most of the work for Phase I was outsourced to a local welder/fabricator. This welder volunteered their time building the gates and in other phases of the project. The welder completed the two gates with minimal help from others. The total amount of time to weld the gates, cut and cap the posts, and secure the hinges was roughly ten hours. The work for Phase I of construction took place offsite at a welding shop in Paso Robles, CA.

**Phase II**

The second construction phase was layout and staking. The process of this was simple. The AutoCAD layout drawing, measuring wheel, tape measure, metal stakes, and spray paint were used in this phase. The layout of the items started on the two most critical areas. These areas are where the two metal posts would be fixed for the gates. They were critical not only because they were holding the gates, but they were also the closest to the main water line. After those two areas were marked, the forty-five-degree angle H-braces were noted. A string line was pulled off the two H-Braces to the existing posts on either side of the posts. Running along the string line, every twelve feet was marked with orange spray paint. As shown in Figure 4. Following the first round of spray paint, the second pass of measuring commenced which marked off the locations of where the wood posts would be located.
Phase III

Phase three consisted of auguring the footings for the eight posts. Two of which were four feet deep, while the remaining six were three feet deep. The two deeper posts were 4x4 HSS for the gates. The three-foot footings were for the six 5” wood posts. The wood posts were used as structural support for the fence.

Before digging could begin, many roadblocks were hit. There were challenges with how the footings would be dug. For the first five weeks of the project, the plan was to borrow an auger from a friend and a tractor from the City Farm SLO. The auger fell through. Plan B was to borrow a two-man auger from another friend. Again, that fell through. Last-minute, a mini skid steer with an auger attachment was rented for the weekend. Renting the mini skid steer and the auger was vital to completing the project. The auger was struggling with the moist soil onsite and took two hours to complete the eight footings. The first two holes were the most difficult because the soil had the highest water content, as shown in Figure 5. Moving away from the waterline, provided much easier because the soil had a lower water content.

Figure 5- Auguring holes for Posts
Phase four comprised placing the concrete and posts in the footings. A rotating concrete trailer was rented with ¾ yards of concrete, as shown in Figure 6. To begin pouring concrete, all footings were measured and dug out to verify they were at the correct depth. The first two footings filled were the posts on either side of the gates. After those posts were set, the gate posts were placed. When the side posts began to set, a string line was tied to either side connecting to the existing posts on the ends of the fence. The string enabled the posts to be in line with one another. Each post was checked every 20 minutes to verify they were level and plum. Because of the wind on site, many of the posts would need to be realigned.

![Figure 6 – Concrete Trailer](Image)

**Phase V**

The final construction phase was phase five. Phase five lasted the longest with the greatest number of activities completed. The first task completed was installing fifteen ten-foot T-posts. Each T-post had to be installed three in the ground. A string line, level, and picket pounder were used to install the T-posts. Next, the fence was pulled. To pull the fence, we secured one end to a post and the other to a truck to be pulled tight. Then, each wire would need to be cut from the truck and tied to the post. This happened twice, once for each side of the gates. Then T-post clips and fence stables are secured. The gates were then installed followed by mounting the cross-tension wire for the H-Braces. Reference Figure 7 to review the completed project.
Lessons Learned

I truly enjoyed the process of completing this project with the City Farm SLO. The project allowed me to network with the community, learn practical construction skills, and build something that will positively affect an organization. This project was a very large project for a single student; although, I enjoyed being able to handle and manage every aspect of the project. I will use the skills I learned for my sr. project to further my professional career.