Building a Handicap Accessible Entrance and Gabion Wall

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As people age, their bodies naturally deteriorate and often times people are confined to wheelchairs in order to get around. Uneven and unstable ground is a large obstacle for people who live confined to a wheelchair. This project was derived and designed in order to help a family with multiple family members bound to wheelchairs to allow them an easier point of access into the home. The project itself consists of the construction of a concrete walkway and a gabion wall to provide some additional aesthetics. The concrete pathway ranges from the driveway to a paver pathway that curves around the side of the house, creating a flat, stable path to push a wheelchair. The gabion wall sits parallel to the concrete pathway and then makes a 90˚ turn toward the street. While constructing the project, I needed to install some sleeves underneath the concrete path to route some drain pipes and TV & Phone lines as well as a 3rd sleeve for future use. The deliverables for this project include the concrete pathway and the gabion wall, with the sleeves being an added scope of work.

Key Words: Concrete, Wheelchair, Gabion Wall, Construction

Introduction

This project came to be because I knew that I wanted to do a project-based senior project. I was born and raised in San Luis Obispo, and knew of a family that has multiple members confined to a wheelchair without an easy way to get them into the house. Before this project started, there were a total of 4 entrances into the house, none of which were wheelchair accessible, mainly due to stairs. The one entrance that didn’t have stairs, required the wheelchair to be pushed over a path made of small size gravel, which often proved to be quite difficult. After learning about these members of the family that couldn’t access the house, I decided to design and build a concrete pathway where the gravel pathway was in order to make the journey from the driveway to the house much easier. While meeting with the owner, it was discovered that the owner wanted a Gabion Wall constructed near the walkway to provide a pleasing aesthetic. The owner provided all of the funding for materials and special equipment needed to construct the walkway and gabion wall.

Steps Taken

The process of this project was determined by myself with help from the owner regarding timing and material purchasing. These are the steps that I followed to make the concrete pathway and the Gabion Wall.

1. Call 811 to locate all underground utilities located in project area
2. Remove gravel pathway and excavate 5” of soil for specified layout of pathway.
3. Locate all future drain lines and excavate an extra 5” for drain pipe sleeve in 2 locations.
4. Locate and excavate 18” from grade and place 2 1” PVC conduits for TV and Phone lines.
5. Level out concrete pathway area to allow for a 4” concrete slab
6. Build formwork, place vapor Barrier, place and tie #4 rebar for the concrete walkway
7. Place concrete, consolidate, level it out, apply broom finish, groove control joints.
8. Remove form boards and clean-up site from concrete placement.
9. Excavate various depths for Gabion wall foundation and for drain pipes.
10. Assemble drain pipe system and backfill trenches.
11. Assemble the gabion wall cages and place the rocks inside.
Figure 1: Excavation

Figure 2: Pre-Pour Site
Figure 3: Post-Pour Site

Figure 4: Gabion Baskets Installed
Deliverables

The official deliverables for this project include the design and construction of a concrete walkway and a Gabion wall. Through the process, however, it was determined that the TV and Phone line conduits and the drain lines would need to be routed underneath the slab, therefore making it a part of the project.

The concrete walkway was designed similar to a common sidewalk. It was to be 4 feet in width for the length of the walkway. The SF of the path was determined through calculations and was calculated to be roughly 150 SF. With a 4” slab for the concrete, it was then determined that the total volume would be 1.85 CY of concrete. The reinforcement for the project was designed by myself with prior knowledge stemming from internships in the industry. It was determined that the reinforcement for the concrete would be #4 rebar @ 12” O.C. all ways. I met with my senior project advisor, Ed Boucher, to get recommendations about what type of concrete and other variables needed when ordering concrete. After meeting with my advisor, I concluded that a 3,000 PSI concrete mix would be
suitable for the application. The aggregate size would be 3/8” and the water-cement ratio would be 40%. These were all decided upon the strength the concrete would give and the ease at which it would be placed.

The Gabion Wall was designed by the owner to fit the needs and wants that he and his wife decided on. The size of the wall was determined to be an ‘L’ shape with the stem being 18’ long and the leg being 6’ long. The location of the wall is on a sloped area, so each 6’ chunk of cage will be benched, raising 6” every 6’. The height of each wall section is 2’ tall and the width is 15”. I travelled with the homeowner to pick out the type of rock to be used inside the cages. After looking at all the types of rock the supplier had, the homeowner and I decided that the Blue Granite Gabion type of rock would be the best to match the style of the rest of the house.

Lessons Learned

During the process of constructing the concrete walkway and the gabion wall, I learned that there are plenty of unforeseen circumstances that can delay a schedule. I failed to recognize that drain lines and the TV and Phone line needed to be routed underneath the slab. This only impacted the schedule because there was added scope, but it was impacted nonetheless. One way to mitigate this before it happened would be to think and talk things through with my adviser and the homeowner more in order to ensure that my plan did not have any gaps in it.

I feel very fortunate to have the opportunity to go out in the community and help a family that desperately needed this pathway built. Being able to use the knowledge that I have gained through school and my previous internships and translate that into this project is very fulfilling.

If I were to do this project again, I would take a little more time thinking about all the steps to ensure that I don’t get blindsided by a significant amount of extra work. Other than this one hiccup, the project went smoothly and everything else went according to plan. I am very proud of the final product that I was able to produce for this family and I wish that more Construction Management students will start to help members of the community for their senior projects. I would also like to thank my classmates Johnny Hernandez, Ross Ludwig, David Friend, and Chris Donatello for helping me pour and finish the concrete.